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Globalstar Resets Launch Campaign as Financing, Regulatory Deadlines Loom

PETER B. de SELDING, PARIS

Mobile communications satellite operator Globalstar on May 5 sought to reassure investors that a component failure aboard one of the six identical satellites launched last October will not recur on the other spacecraft and that the launch of the next 18 satellites should proceed starting in July.

But the company conceded it was facing deadlines to finance the ground segment planned to permit the spacecraft to work to full advantage, and other time limits on securing a permanent U.S. license to operate its second-generation constellation.

Globalstar Chairman Jay Monroe said in a May 5 interview that the company scrapped a planned May launch of a second batch of six second-generation satellites following the in-orbit failure of a momentum wheel on a satellite launched in October.

Momentum wheels maintain a satellite in stable position in orbit. Each 700-kilogram Globalstar second-generation spacecraft is equipped with four momentum wheels, but needs only three to function.

Monroe said the satellite in question is working well. After several weeks spent checking the manufacturing and testing history on the momentum wheels built for all 24 second-generation Globalstar spacecraft, the company has concluded that the defect is limited to the single wheel.

"We have identified what we think the problem is and it relates to assembly and testing. The problem is understood and at the moment we do not believe we will have issues on other satellites," Monroe said. He said the suspect assembly and testing procedures were used on other momentum wheels, but that as chance would have it, all the others are still on the ground awaiting launch.

Thales Alenia Space of France and Italy is prime contractor for the 24 second-generation Globalstar satellites. Goodrich Corp. of Charlotte, N.C., provides the satellites' momentum wheels.

Discovery of the problem in orbit in early April obliged Covington, La.-based Globalstar to halt plans for a mid-May launch of a second six-satellite batch of satellites aboard a Russian Soyuz rocket operated from the Russian-run Baikonur Cosmodrome in Kazakhstan.

The launch is being handled through Europe's launch consortium, Arianespace of Evry, France, though the Franco-Russian Starsem joint venture in which Arianespace is a shareholder.

Monroe said the launch has been rescheduled for mid-July, which should give Arianespace and Starsem enough time to launch two more groups of six satellites by the end of the year. An Arianespace official on May 5 confirmed this schedule.

Monroe said there are no debt covenants or regulatory requirements that would penalize Globalstar if the last launch slipped into early 2012.

In a May 5 filing with the U.S. Securities and Exchange Commission (SEC), Globalstar said it is nonetheless facing pressure on both the financial and regulatory fronts.

On the financial side, the company has already renegotiated its payment schedule with ground system providers Hughes Communications and Oceus Networks, the former Ericsson Federal Inc. The larger contract, with Germantown, Md.-based Hughes, has been rewritten to permit Globalstar to withhold payments until July 31. After that, Hughes will demand interest payments of 10 percent a year on the outstanding funds. Oceus has negotiated similar terms.

With Thales Alenia Space, Globalstar has negotiated an overall contract for 48 satellites, with a series of loans and the manufacturer's current development work covering

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ARIANESPACE PHOTO

In preparation for an Oct. 20 launch from Kazakhstan, the upper segment of the satellite dispenser holding two Globalstar satellites is lifted for attachment atop the lower dispenser holding four satellites.

PERIODICALS-NEWSPAPER HANDLING

NEWS BRIEFS

NASA PHOTO BY KIM SHIFLETT

Checks of Endeavour instruments go on

NASA's Next Shuttle Launch Again Delayed Until May 16

The final launch of Space Shuttle Endeavour has been rescheduled for no earlier than May 16 to give technicians more time to address electrical problems that forced NASA to scrub an April 29 launch attempt.

NASA managers set the new launch target May 6 following a meeting to review progress on the repairs. The primary purpose of Endeavour's mission is to deliver a load of spare parts to the international space station and install the Alpha Magnetic Spectrometer, a $2 billion particle physics experiment.

Australia Doles Out $320M in Satellite Broadband Awards

Satellite operators Optus of Australia and Thaicom of Thailand, and satellite user-terminal builder Gilat of Israel, have won contracts totaling 300 million Australian dollars ($320.6 million) to provide satellite broadband services to consumers and small businesses as part of Australia's massive investment in broadband connectivity, Australia's NBN Co. announced May 6.

The contracts, each for five years, will jump-start Australia's National Broadband Network, which features cable, terrestrial wireless and, starting in 2015, two Ka-band broadband satellites that together will extend broadband to nearly every Australian citizen.

NBN Co., which is overseeing the purchase and installation of the hybrid network, said Australia's domestic satellite operator, Optus, will provide managed satellite services and some of its own satellite capacity using ground equipment provided by Gilat Satellite Networks. The Optus-Gilat contract is valued at about 200 million Australian dollars.

Thaicom will provide capacity on its IPStar/Thaicom 4 Ku-band broadband satellite, for which Australia has been one of the largest markets since it was launched in 2005, in a contract with NBN Co. valued at slightly more than 100 million Australian dollars.

The contracts will provide customers located outside the reach of Australia's terrestrial grid with download speeds of up to 6 megabits per second and upload speeds of up to 1 megabit per second.

This interim capacity, whose service could be extended beyond five years, is intended to provide consumers in remote locations with broadband access while NBN Co. selects from among multiple teams vying to provide the country's permanent satellite-based broadband network.

In its May 6 announcement, NBN Co. said it expects that eligible customers — meaning those located in areas deemed to be in greatest need of satellite links — will receive a service of up to 12 megabits per second on the downlink once the two dedicated broadband satellites are launched in 2015.

Petah Tikva, Israel-based Gilat said May 6 that it will provide Optus with an initial network of 11 SkyEdge 2 hub stations and 20,000 SkyEdge 2 terminals to be deployed within three years, with a possible expansion to 48,000 user terminals. Gilat has created an Australian subsidiary, Gilat Satellite Networks Australian Pty Ltd., to manage the contract, which Gilat said is valued at up to 112.3 million Australian dollars if all 48,000 terminals are ordered.

Gilat said its terminals will connect to the Ku-band capacity on the Optus and Thaicom satellites.

Thaicom's Australian subsidiary, IPStar Australia Pty Ltd., already serves some 80,000 customers in rural Australia, with most of these subscribers taking advantage of equipment subsidies under the Australian Broadband Guarantee, an existing government broadband-stimulus program.

NBN Co., which is owned by the Australian government, is managing the National Broadband Network's deployment over 10 years. The project's construction cost, including the two satellites as well as fiber installation and deployment of terrestrial-wireless gear, is estimated at 36 billion Australian dollars.

Lease Consolidation Erodes Telenor's Quarterly Revenue

Satellite fleet operator Telenor Satellite Broadcasting of Norway on May 5 reported a sharp drop in revenue for three months ending March 31 as its principal direct-broadcast television customer, Norway's Canal Digital, consolidated its bandwidth leases into a single contract and won volume-discount concessions.

Partly offsetting the reduced revenue from Canal Digital was increased business from customers in Central and Eastern Europe, a region that Telenor has made a special focus in recent years, offering satellite lease prices that are often lower than those offered by SES of Luxembourg and Eutelsat of Paris.

In a May 6 statement in response to *Space News* inquiries, Telenor said Canal Digital previously had multiple fixed-price contracts, some of them signed before high-definition television was introduced. Combining these into a single lease agreement, and agreeing to volume discounts, will reduce Canal Digital revenue for the foreseeable future, Telenor said. Canal Digital has increased its satellite bandwidth demand over the years, from seven in 2002 to more than 20 transponders now, Telenor said.

The effect on revenue for the first three months of 2011 was dramatic. Telenor reported revenue of 239 million Norwegian Kroner ($42.7 million), down 12 percent from the previous three-month period and down 8 percent from a year ago.

EBITDA, or earnings before interest, taxes, depreciation and amortization, was 67.8 percent of revenue, down from 70 percent in the previous quarter and 74 percent from a year ago.

"We expect growth at the current level," Telenor said in its May 6 statement. "In the near future, growth will be limited as capacity is reserved and we are closing some of the Middle East capacity to re-point for the northern European maritime market."

Telenor recently won approval from its parent company, mobile network operator Telenor ASA of Oslo, to order a Thor 7 satellite before July. Thor 7, to be launched in early 2014, will carry a mixed Ku- and Ka-band payload to serve Telenor's existing markets and, for the Ka-band, to provide broadband links to maritime customers in Telenor's home Nordic region.

Telenor moved its aging Telenor 3 satellite to a new orbital slot, 4 degrees west, where it is operated in inclined orbit — meaning it is no longer stabilized on its north-south axis — to save fuel. Telenor estimates that, operated in this way, Thor 3 has another six to 10 years of service life.

"We have had an incredibly good response in the market for 4 degrees west," Telenor said. "We now have three transponders left on Thor 3, with a number of prospects for this remaining capacity." The company said the revenue benefit from Thor 3's new location will not be felt until later this year.

NASA Selects 3 Finalists For 2016 Discovery Mission

Three ambitious space missions have made NASA's short list for a planned robotic planetary expedition to launch in 2016. The candidates include a mission to glimpse Mars' interior, a voyage to the extraterrestrial sea of Saturn's moon Titan, and a probe to take an unprecedented look at the surface of a comet's core.

NASA plans to spend the next year studying the three concepts before selecting one to proceed toward launch under the agency's Discovery Program of cost-capped space science missions. The investigation team for each mission proposal will receive $3 million for a preliminary design stage, NASA officials said.

The chosen mission will be given a fixed budget of $425 million, not including the cost of its launch vehicle.

"This is high science return at a price that's right," Jim Green, director of NASA's Planetary Science Division, said in a statement. "The selected studies clearly demonstrate a new era with missions that all touch their targets to perform unique and exciting science."

The three Discovery finalists are:

■ The Geophysical Monitoring Station (GEMS), a Mars lander designed to study the structure and composition of the planet's interior, potentially improving scientific understanding of the formation and evolution of terrestrial planets. NASA's Jet Propulsion Laboratory in Pasadena, Calif., would manage the project.

■ The Titan Mare Explorer (TiME), which would land in and float on a large methane-ethane sea on Saturn's moon Titan, providing the first direct exploration of an ocean beyond Earth. The Johns Hopkins University Applied Physics Laboratory in Laurel, Md., would manage the project.

■ Comet Hopper, a probe designed to land on a comet multiple times and observe its changes as it interacts with the sun. NASA's Goddard Spaceflight Center in Greenbelt, Md., would manage the project.

In addition, the Discovery Program also chose three space technology development efforts for potential future planetary missions:

■ NEOCam: A telescope to analyze near-Earth objects, study their origin and evolution, and monitor their risk of impacting Earth.

■ Primitive Material Explorer (PriME): A mass spectrometer that would yield highly precise measurements of a comet's chemical composition and explore comets' role in delivering the potential ingredients of life to Earth.

■ Whipple: An effort to develop and test a technique called blind occultation to discover and investigate celestial objects in the outer solar system.

In upcoming years, research teams will bring their respective technologies to a higher level of readiness, receiving funding determined through contract negotiations, NASA said. They must demonstrate progress in a future mission proposal competition to be considered for flight.

Altwegg, MDA's Top Civilian From 2008 to 2011, Dies at 81

David M. Altwegg, the retired U.S. Navy rear admiral who stepped down in February as executive director of the Missile Defense Agency (MDA), died April 18 at his home in Alexandria, Va. He was 81 and had leukemia. Altwegg served in the federal government for 64 years and retired Feb. 23 after serving as the MDA's top civilian official since 2008. The Pentagon has yet to name his replacement.

Altwegg graduated from the Naval Academy in 1952 and did tours of duty in the Vietnam and Korean wars before retiring from active duty in 1985. He received numerous awards including the Legion of Merit, Bronze Star and Meritorious Service Medal.

Altwegg is survived by his wife Rosina, a daughter and two grandchildren. A visitation was held April 23 at the Demaine Funeral Home in Alexandria, and he will be buried at Arlington National Cemetery at a date to be determined, the funeral home said.

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CORRECTION

The story "Inmarsat Banks on Ship Equip Deal To Boost Customer Base" [May 2, page 10] should have said satellite fleet operator Intelsat is adjusting beams on several of its satellites to serve the maritime broadband market in Ku-band.

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GAO Questions Funding Hike for FAA Office

AMY SVITAK, WASHINGTON

The U.S. office that regulates the commercial space transportation industry does not need the funding increase being sought by the White House next year given the uncertainty surrounding the markets it oversees, a U.S. government auditor told lawmakers May 5.

U.S. President Barack Obama requested $26.6 million for the Office of Commercial Space Transportation, part of the U.S. Federal Aviation Administration, for next year, a 74 percent increase over 2010. The raise would enable the office to increase its staff from 71 to 103 next year as it gears up for new services poised to enter the market, including hauling crews and cargo to the international space station.

But in testimony before the House Science, Space and Technology space and aeronautics subcommittee, Gerald Dillingham, director of physical infrastructure at the U.S. Government Accountability Office, said a more gradual expansion of the commercial space transportation office makes sense given the industry's pace of development.

"We have argued that, maybe incrementally based on the development of industry, one could start making that move in that direction, rather than big-bang theory," Dillingham said during a question-and-answer session with lawmakers following his prepared remarks.

The Office of Commercial Space Transportation develops rules governing the industry and licenses individual launches and atmospheric re-entries. In the 1990s the office dealt mainly with commercial satellite launches, but with that industry having moved largely offshore, the new regulatory focus is on privately operated vehicles designed either for suborbital missions or to deliver astronauts and cargo to and from the international space station.

Dillingham said the market for such services is uncertain. Although 2004 saw significant activity — Scaled Composites-built SpaceShipOne flew three suborbital missions that year — follow-on flights that were anticipated shortly thereafter have not yet materialized.

George Nield, head of the Commercial Space Transportation office, acknowledged that the commercial spaceflight industry has been slower to progress than hoped, but said flight activity is expected to increase in the next two years as companies like Virgin Galactic, which has developed a system that will carry paying passengers to the edge of space, begin operations. Nield also noted that commercial deliveries of cargo to the space station are expected to begin next year.

NASA also is funding the development of privately operated crew taxis that are expected to come on line within the next five to 10 years. The Office of Commercial Space Transportation eventually hopes to ramp up to 200 people.

"As we look at what we're seeing now … there's a lot bubbling out in the world right now, and I think we're about to see a rapid increase in a variety of different parts of the industry," Nield told the subcommittee.

Several subcommittee members raised concerns regarding the proposed spending increase. Rep. Sandy Adams (R-Fla.), whose district includes NASA's Kennedy Space Center, chastised Nield for seeking a significant spending increase in the current budget environment. Both she and Rep. Steven Palazzo (R-Miss.), who chairs the subcommittee, questioned the FAA's plan to regulate an industry in its infancy.

"How would [FAA] go about the task of regulating an industry that for all practical purposes does not exist yet?" Palazzo asked.

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only the first 24 satellites. In a May 5 conference call, Globalstar Chief Executive Peter Dalton said one of the company's top priorities is to come to terms with Thales Alenia Space on construction of more spacecraft.

In the SEC filing, Globalstar said it has opened negotiations with Thales Alenia Space to seek more-favorable contract terms for the follow-on satellites. The Franco-Italian manufacturer has already procured long-lead items for six additional spacecraft beyond the 24 covered by the existing contract, and these parts have been placed into storage.

On the regulatory side, Globalstar is facing a problem that Monroe said no one was aware of until relatively recently.

Unlike the first-generation Globalstar constellation, which was registered in the United States, the second-generation satellites are registered in France. France is home not only to Thales Alenia Space but also to the French export-credit agency, Coface, which is backing Globalstar's bank loans.

To be able to operate the second-generation satellite service in the United States, Globalstar must have France register the system with the U.N. under the U.N. Outer Space Treaty and the Convention on Registration of Objects in Outer Space.

Monroe said this U.S. requirement had escaped the attention of everyone involved. The result is that even now, several months after the first six second-generation satellites were declared operational, Globalstar cannot use them to serve U.S. customers. Because of coverage overlaps with Globalstar's ground stations, the prohibition concerns Canada and Mexico as well.

In its SEC filing, Globalstar said it received U.S. regulatory approval on March 18 for the second-generation system pending U.N. registration. On March 24, it said, it filed an application to French regulators for the system. The French side then returned with requests for additional information, which Globalstar said it provided April 27.

Monroe said French regulators have now received all the information they need to process the application and file the necessary documents with the U.N. The SEC document does not address why the initial application in France was not filed until March 24. Barbee Ponder, Globalstar's general counsel and vice president of regulatory affairs, said in a May 6 statement:

"The licensing process involved discussions with the U.S. and French regulators regarding which country would register the second-generation satellites. Globalstar decided to pursue registration with France and, thus, made the initial filing on March 24."

Monroe said he believes the French registration with the U.N. will occur in July.

In addition to preventing Globalstar from serving its most important market — the United States — with full two-way voice and data communications, the delay in registration is of concern to Globalstar's creditors. The Coface-backed loan requires the company to have a permanent U.S. license by Aug. 31 or risk a default. The loan also requires Globalstar to have completed in-orbit acceptance of 18 of its second-generation satellites by Jan. 1, 2012, or all 24 satellites by Sept. 1, 2012.

China Viewed as Potential U.S. Partner in Future Mars Exploration

AMY SVITAK, WASHINGTON

U.S. President Barack Obama views China as a potential partner for an eventual human mission to Mars that would be difficult for any single nation to undertake, a senior White House official told lawmakers.

Testifying May 4 before the House Appropriations commerce, justice, science subcommittee, White House science adviser John Holdren said near-term engagement with China in civil space will help lay the groundwork for any such future endeavor. He prefaced his remarks with the assertion that human exploration of Mars is a long-term proposition and that any discussion of cooperating with Beijing on such an effort is speculative.

"[What] the president has deemed worth discussing with the Chinese and others is that when the time comes for humans to visit Mars, it's going to be an extremely expensive proposition and the question is whether it will really make sense — at the time that we're ready to do that — to do it as one nation rather than to do it in concert," Holdren said in response to a question from Rep. Frank Wolf (R-Va.), a staunch China critic who chairs the powerful subcommittee that oversees NASA spending.

Holdren, who said NASA could also benefit from cooperating with China on detection and tracking of orbital debris, stressed that any U.S. collaboration with Beijing in manned spaceflight would depend on future Sino-U.S. relations.

"But many of us, including the president, including myself, including [NASA Administrator Charles] Bolden, believe that it's not too soon to have preliminary conversations about what involving China in that sort of cooperation might entail," Holdren said. "If China is going to be, by 2030, the biggest economy in the world … it could certainly be to our benefit to share the costs of such an expensive venture with them and with others."

PHOTO BY THOMAS BROWN

John Holdren

Wolf, who characterizes China's government as "fundamentally evil," said it is outrageous that the Obama administration would have close ties with Beijing's space program, which is believed to be run primarily by the People's Liberation Army, or PLA.

"When you say you want to work in concert, it's almost like you're talking about Norway or England or something like that," an irate Wolf told Holdren, repeatedly pounding a hand against the table top in front of him. "As long as I have breath in me, we will talk about this, we will deal with this issue, whether it be a Republican administration or a Democrat administration, it is fundamentally immoral."

Holdren said he admired Wolf's leadership in calling attention to China's human rights record, but noted that even when then-U.S. President Ronald Reagan referred to the former Soviet Union as "the evil empire" in the late 1980s, he continued to cooperate with the communist bloc in science and technology if doing so was deemed in the U.S. national interest.

"The efforts we are undertaking to do things together with China in science and technology are very carefully crafted to be efforts that are in our own national interest," Holdren said. "That does not mean that we admire the Chinese government; that does not mean we are blind to the human rights abuses."

Holdren said that as White House science adviser, his capacity to influence the president's diplomatic approach to Beijing is limited.

"I am not the person who's going to be whispering in the president's ear on what our stance toward China should be, government to government, except in the domain where I have the responsibility for helping the president judge whether particular activities in science and technology are in our national interest or not," Holdren said.

Recently enacted legislation prohibits U.S. government collaboration with the Chinese in areas funded by Wolf's subcommittee, whose jurisdiction also includes the U.S. Commerce and Justice departments, the National Science Foundation and the National Institute of Standards and Technology.

When asked how he interpreted the new law, part of a continuing resolution approved in April that funds federal agencies through Sept. 30, Holdren said the administration will live within the terms of the prohibition.

"I am instructed, after consultation with counsel, who in turn consulted with appropriate people in the Department of Justice, that that language should not be read as prohibiting actions that are part of the president's constitutional authority to conduct negotiations," Holdren said. "At the same time there are obviously a variety of aspects of that prohibition that very much apply and we'll be looking at that on a case by case basis in [the White House Office of Science and Technology Policy] to be sure we are compliant."

Rep. John Culberson (R-Texas), who joined Wolf last fall in opposing an official visit to Beijing by Bolden, accused Holdren and the White House of plotting to circumvent the law.

"It's not ambiguous, it's not confusing, but you just stated to the chairman of this committee that you and the administration have already embarked on a policy to evade and avoid this very specific and unambiguous requirement of law if in your opinion it is in furtherance of negotiation of a treaty," Culberson said. "That's exactly what you just said. I don't want to hear about you not being a lawyer."

Holdren said a variety of opinions and legal documents indicate the president has exclusive constitutional authority to determine the time, scope and objectives of international negotiations and discussions, as well as the authority to determine the preferred agents who will represent the United States in those exchanges.

Culberson reminded Holdren that the administration's civil research and development funding flows through Wolf's subcommittee, and that funding could be choked off if the White House fails to comply with the law.

"Your office cannot participate, nor can NASA, in any way, in any type of policy, program, order or contract of any kind with China or any Chinese-owned company," Culberson said. "If you or anyone in your office, or anyone at NASA participates, collaborates or coordinates in any way with China or a Chinese-owned company … you're in violation of this statute, and frankly you're endangering your funding. You've got a huge problem on your hands. Huge."

Rep. Wolf Says White House Shortchanging Exploration With 'Unacceptable' Budget

AMY SVITAK, WASHINGTON

U.S. President Barack Obama's $18.7 billion budget blueprint for NASA in 2012 was sharply questioned by a top appropriator in the U.S. House of Representatives who said it neglects to robustly fund development of new space exploration hardware mandated in two congressional acts.

During a May 3 hearing of the House Appropriations commerce, justice, science subcommittee, Rep. Frank Wolf (R-Va.), who chairs the panel, said Obama's attempt to scrap NASA's Moon-bound Constellation program in favor of investing in privately developed space taxis and cutting-edge technology was "soundly repudiated by Congress," which has since adopted legislation directing the agency to salvage much of the scuttled program to develop a heavy-lift Space Launch System and Multi-Purpose Crew Vehicle.

"It seemed like the administration didn't learn its lesson, though, because this year's NASA budget is also unacceptable," Wolf told White House science adviser John Holdren, who defended the budget request for NASA and other civil research and development agencies at the hearing. Wolf accused the White House of shortchanging the heavy-lift rocket and crew capsule in its 2012 budget blueprint to cover increases in Earth science, space technology and commercial spaceflight.

"Why does the administration insist on using the exploration program as a bank to pay for the other priorities?" Wolf asked.

Holdren disagreed with Wolf's characterization. "I wouldn't phrase it quite that way," he said.

Holdren stressed that the president's budget still funds key ingredients of the space exploration hardware mandated in the 2010 NASA Authorization Act. The law directs NASA to spend $4 billion next year — $1.2 billion less than the president requested — on the crew capsule and heavy lifter ultimately capable of delivering 130 tons to low Earth orbit.

However, "if we want to maintain access for U.S. astronauts to the $100 billion international space station on U.S. rockets, if we want to minimize the gap during which we would be dependent entirely on the Russian Soyuz, we absolutely have to make investments in commercial crew development," he said. With the space shuttle slated to retire this year, NASA plans to rely on Russia to deliver crews to the orbiting outpost until privately developed rockets and spacecraft come on line later this decade.

"At the same time we need to invest in those technologies, the heavy lift and the crew capsule, to be ready for the next step, and there's a balancing act involved in doing that under a budget cap that is lower than what one would want to pursue all those goals," he said.

Holdren attributed NASA's slow start on the Space Launch System to a prohibition on canceling Constellation and initiating new programs that was contained in last year's appropriation. That prohibition was lifted in April.

"By the time we were relieved of that constraint, you weren't in the same position that you would have been in if throughout fiscal year 2011 you had more flexibility," Holdren said.

Wolf cited new language in a continuing resolution enacted in April — which funds the federal government for the remainder of 2011 — that directs immediate development of the 130-ton heavy-lift rocket and space capsule. The measure included $3 billion for both the rocket and crew capsule.

"Do you view the lift capability requirement as legally binding?" Wolf asked.

Holdren said the Obama administration is legally obliged to pursue the requirement, though whether or not NASA has a realistic shot at attaining the goal by the 2016 date directed in the authorization act remains to be seen.

"I don't think we can necessarily legislate success," he said. "Ultimately we will get 130 metric tons, whether we will get it by the date in the legislation, that's something we are obliged to do and we will try to do it. Sometimes what the Congress wants, however admirable, is not necessarily achievable under the available budgets, and in the time available. So we're going to try … but it's going to be a challenge."

Asserting that the administration would prefer to build a less-capable rocket, Wolf asked what kind of deep space exploration payload could be launched on a vehicle capable of placing 70 to 100 metric tons into orbit.

Holdren said the question was beyond his level of expertise. But he speculated that such an intermediate step would prepare the way for the larger lift capability and said a capable deep space exploration vehicle could be launched in sections on the multiple smaller rockets and assembled on orbit.

Wolf also questioned why the administration is not requesting a budget increase for NASA. "How does a flat NASA budget reflect an administration's emphasis on scientific investment?" he said.

Holdren said he would have preferred to see a bigger budget for NASA."Unfortunately at this particular juncture there's not enough money and some difficult choices have been made," he said.

Unmoved, Wolf said other federal research and development agencies saw increases while NASA's budget was flat-lined, "and that just doesn't make any sense."

MDA Corp. Sets Internal Deadline for Reaching Acquisition Decision

PETER B. de SELDING, PARIS

Canada's MDA Corp. will either decide on a large acquisition of a U.S. satellite hardware or space services company by July or return to shareholders the cash it is now retaining for such a deal, MDA Chief Executive Daniel E. Friedmann said May 3.

The sale of its property-information business in January has transformed Richmond, British Columbia-based MDA into a company almost entirely focused on the space industry — space robotics, satellite construction and Earth observation services via satellite and from unmanned aerial vehicle services.

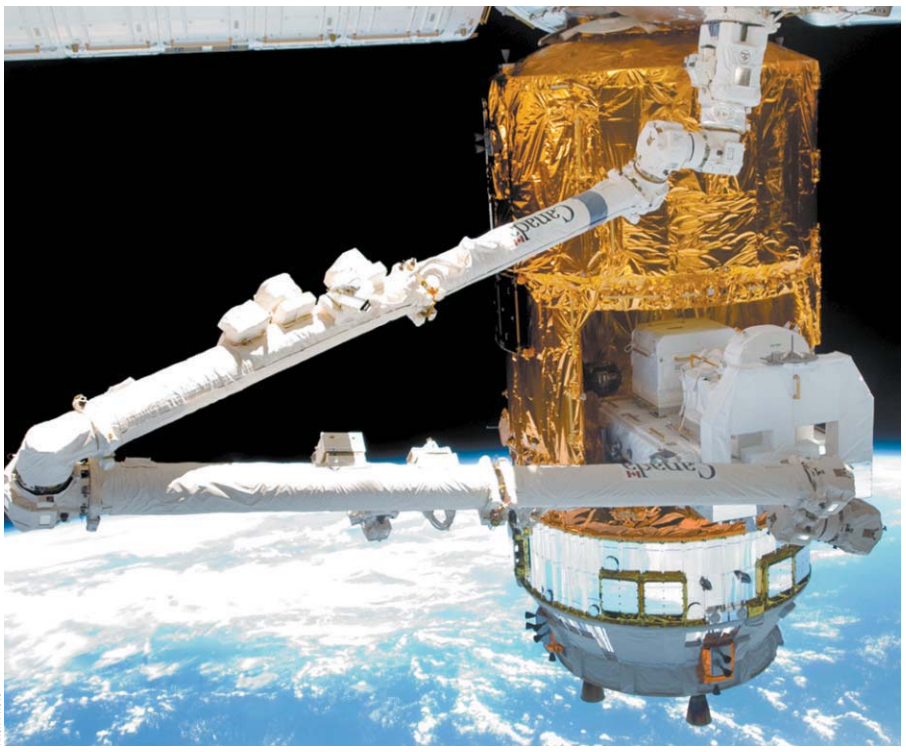
It has also given the company a treasury that, as of March 31, totaled 793 million Canadian dollars ($839 million) — the equivalent of nearly a year's revenue for MDA at its current size.

In a conference call with investors, Friedmann made clear the company is searching for a large target and not a strap-on acquisition. Key characteristics of the target company would be a solid entry into the U.S. government market and a presence in markets where MDA has expertise that could be transferred to a U.S. operation for access to government business.

"We are looking at deals of a billion dollars, 400 million, 200 million," Friedmann said. "The goal is to try to get somewhere by July. We don't want to hold on to that money much longer than that."

MDA has been repositioning itself in the past couple of years as a full satellite prime contractor and not a component builder. It also has made an initial financial commitment to inventing a market for performing refueling and minor repairs of satellites already in orbit.

The company has won major telecommunications satellite electronics payloads contracts in Russia and is prime contractor for Ukraine's first national telecommunications satellite.



NASA PHOTO

MDA is now almost entirely focused on the space industry — Earth observation services, satellite construction and space robotics, such as the MDA-built Special Purpose Dextrous Manipulator attached to the international space station (above).

The Ukrainian work had been stalled as Ukrainian authorities sorted out the satellite's orbital slot and broadcast-frequency registration with international regulators.

Those regulatory discussions put the contract about four months behind its original schedule, Friedmann said. But recently Ukraine has settled the issue and work has restarted. The satellite is scheduled for launch in mid-2013.

MDA is prime contractor for Canada's next-generation Radarsat Earth observation system, called Radarsat Constellation Mission (RCM), but Canadian government financial pressures have forced the Canadian Space Agency to parcel out RCM contract awards in small slices. The latest, awarded in March, is valued at 9 million Canadian dollars and permits MDA to continue work only through May.

Friedmann said upcoming Canadian elections could force a pause in the RCM work, which would cause the overall contract to increase in cost. He said negotiations are under way to permit MDA to tailor its RCM work rhythm to allow it to continue working through an election-related funding suspension.

MDA's business of providing unmanned aerial surveillance services to governments involved in the war in Afghanistan is about to take a hit when the Canadian government, the service's biggest customer, pulls out of the U.S.-led coalition in July.

MDA believes there is continued unmet demand for such unmanned aerial vehicle, or UAV, services in Afghanistan in addition to its Canadian and Australian customers, but the company has warned investors that it will not be able to make up the loss of the Canadian business, at least not in the short term.

Friedmann has been personally backing MDA's Space Infrastructure Servicing (SIS) business proposal, which proposes to refuel aging satellites in orbit for a fee paid by the satellites' owners. The proposal has won a tentative commitment from satellite fleet operator Intelsat of Luxembourg and Washington, which has agreed to pay some $280 million to MDA on completion of refueling of a half-dozen Intelsat satellites.

Intelsat General Corp. of Washington is working with MDA to find an additional customer in one or more U.S. government agencies. The two companies have said they would complete their initial work on SIS by mid-2011. Friedmann said that date still holds. He did not say whether MDA and Intelsat could proceed with the mission even without another customer.

For the three months ending March 31, MDA Corp. reported revenue of 206.5 million Canadian dollars, up 35 percent from the same period a year ago after having accounted for the separation of the property-information business. The Russian and Canadian satellite contracts figure heavily in the company's current revenue stream.

Operating earnings, at 26.8 million Canadian dollars, were up 16.5 percent. Backlog at March 31 stood at 877 million Canadian dollars, down 12 percent from where it was Dec. 31. Friedmann said the company has won several multimillion-dollar contracts since March 31, including a contract valued at 40 million Canadian dollars with satellite builder Thales Alenia Space of France to build electronics gear for 81 second-generation Iridium mobile communications satellites.

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DigitalGlobe Commercial Sales Falling Short of Projections

PETER B. de SELDING, PARIS

Satellite imagery provider DigitalGlobe on May 3 said its commercial business is facing an unexpected headwind this year and will fall short of the company's earlier growth projections of 25 percent or more.

The Longmont, Colo.-based company said the slower-than-forecasted growth in what remains a minority of its total business — U.S. and foreign defense and intelligence customers account for 80 percent of DigitalGlobe's revenue — is due mainly to large contracts that are taking longer to materialize than predicted. The potential revenue has not disappeared, it has only been delayed, company officials said.

The shortfall will mean DigitalGlobe, which this year had promised investors that total revenue in 2011 would increase by 10 percent, to $355 million, now is more likely to gross somewhere between $330 million and $355 million.

"The pipeline is not where we need it to be to deliver" on the previous revenue target, DigitalGlobe Chief Executive Jeff Tarr said in a May 3 conference call with investors.

Tarr, who became chief executive in March following the resignation of Jill D. Smith, declined to give examples of the kind of contract that was taking longer than expected to conclude.

He said the company has recently sealed a multiyear agreement with a fifth Direct Access Partner, meaning a government that, following U.S. government approval, is able to task and download data directly from DigitalGlobe's WorldView-1 or WorldView-2 Earth observation satellites in its assigned territory.

This fifth customer will add about $10 million in annual revenue for DigitalGlobe, bringing the total Direct Access Partner revenue to $50 million per year, starting in 2012. Tarr declined to disclose the identity of the latest direct-access customer. He said DigitalGlobe signed a five-year agreement with Turksat, Turkey's satellite telecommunications operator, to resell DigitalGlobe imagery products to Turkish government and business customers.

DigitalGlobe operates three satellites. Its QuickBird spacecraft, which was launched in 2001 and is nearing the end of its operational life, was raised to a higher orbit in March to save fuel and delay its retirement by about 18 months, to early 2014. At that point, the company's WorldView-3 satellite, which has five times QuickBird's capacity, is expected to be in operation.

Raising QuickBird's orbit from 450 kilometers to 482 kilometers reduced its imaging resolution quality by about 7 percent, Tarr said.

DigitalGlobe in mid-2010 signed a contract valued at up to $3.55 billion over 10 years with the U.S. National Geospatial-Intelligence Agency under which the company will provide a monthly output of imagery. The contract's monthly value will increase once the WorldView-3 satellite is in orbit, and following the addition of seven new ground stations located at medium-latitude territories. The first four of these facilities are expected to be in operation by the end of 2011, Tarr said.

The company remains confident that the U.S. government contract, called EnhancedView, is on solid ground and will not be materially affected by the ongoing budget-reduction effort among all U.S. government agencies.

For the three months ending March 31, DigitalGlobe reported revenue of $77.1 million, which was flat compared with the same period a year earlier. Defense and intelligence contracts accounted for $61.7 million in revenue, down 1.4 percent compared to a year ago. But the figure does not include some $24.8 million in EnhancedView contract revenue that has been deferred, but ultimately will be booked.

Of this defense and intelligence revenue, the Direct Access Partner program accounted for $9.4 million from the four existing customers.

Commercial revenue, at $15.4 million, was up 6.2 percent compared with the first three months of 2010.

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Ergen Sheds Faint Light on Plans for Newly Acquired DBSD

PETER B. de SELDING, PARIS

Satellite telecommunications magnate Charlie Ergen said May 2 his $1.4 billion purchase of bankrupt satellite broadband startup DBSD North America is not the start of a broader plan to use DBSD's S-band spectrum to create a terrestrial wireless network.

DBSD, Ergen said, should be viewed as an asset whose existing S-band satellite and U.S. operating license are sufficient for Ergen's Dish Network and EchoStar companies to create a wireless broadband business.

"This is an acquisition of a company out of bankruptcy. We think we can enhance the product for consumers, but it does not require a build-out terrestrially," Ergen said in a conference call with Dish Network investors. DBSD, the former ICO, has launched a satellite that covers the whole of the United States.

"It's up to us to create the product that people are willing to pay for that uses their satellite assets today," he said. "We're primarily a satellite company. I don't want to give the impression that we're in this terrestrial company that's going to build out a bunch of terrestrial stuff that we don't understand."

Ergen's two Englewood, Colo.-based companies in recent months have concluded several big-ticket purchases that Ergen said ultimately fit together into a strategy that he declined to disclose beyond saying it existed.

Dish Network has purchased the Blockbuster video rental chain and mass of wireless spectrum and DBSD. Through EchoStar, Ergen has purchased established satellite-broadband specialist Hughes Communications of Germantown, Md., and a large piece of TerreStar Networks, which like DBSD has launched a large S-band satellite and more recently filed for Chapter 11 bankruptcy protection from its creditors.

ALEX WONG/GETTY IMAGES

Charlie Ergen

EchoStar had originally sought to purchase TerreStar outright before deciding on the Hughes acquisition.

"Hughes was a more definitive, less speculative [investment] than TerreStar would be," EchoStar Chief Financial Officer David Rayner said in a May 2 conference call with EchoStar investors. TerreStar decided after the EchoStar bid fell through to proceed with an auction of its assets, but EchoStar will not be bidding. "We do not have any plans to show up at the auction," Rayner said, stressing that for EchoStar, the TerreStar holdings are a financial asset to be cashed in.

Industry officials, and DBSD/ICO and TerreStar management, have agreed for years that the two companies, and their S-band spectrum, would be much stronger combined than if pursued as separate businesses.

During the call, Rayner and EchoStar Chief Executive Michael T. Dugan refused to be drawn into a discussion of how EchoStar's plan to cash in its TerreStar stake fits with Dish Network's strategy of developing DBSD/ICO as a business. Ergen is majority owner of Dish and EchoStar, which was spun off from Dish in 2008. Be that as it may, they are two separate, publicly traded companies that do not necessarily coordinate strategy, Dugan said.

Dugan said EchoStar's $2 billion purchase of Hughes is expected to close in the coming weeks following approval by the U.S. Federal Communications Commission. Dish's purchase of DBSD/ICO also awaits FCC authorization.

DBSD and TerreStar have both been "spectrum plays," meaning companies whose satellite investments were viewed by Wall Street mainly as necessary regulatory detours on the way to the rollout of a terrestrial wireless network in the United States.

It is a strategy being followed by LightSquared of Reston, Va., and its owner, hedge fund Harbinger Capital Partners of New York. But LightSquared, which has a large L-band satellite in orbit, has had difficulty securing the necessary partners to construct the multibillion-dollar network of ground stations needed to offer a mobile broadband service.

LightSquared is being slowed by a debate over whether its ground stations will cause unacceptable interference with GPS positioning, navigation and timing satellite signals. A technical working group is examining the issue and is expected to deliver its assessment June 15.

"We're watching closely what LightSquared does," Ergen said during the Dish Network conference call. "I think our spectrum fits nicely with them in terms of how they go about doing it."

But Ergen stressed that lots of spectrum-focused investments, including Ergen's purchase of a piece of the so-called 700 megahertz spectrum at auction in 2008, have not immediately led to system build-outs.

Some investments in the area appear to have gone sour, he said. "So we have to be careful about knowing exactly what we're doing, making sure there is what we believe to be a good return on investment. … To build it out in the wireless space, if that was the decision — I think you would see us work with people who are more expert in the business than we are."

Ergen is accustomed to doing what he wants with his companies and not spending lots of time explaining his moves to investors. He compared his recent purchases to an episode of the U.S. television comedy "Seinfeld," in which a series of ostensibly unrelated events occurs for 28 minutes before they are tied together in the show's final two minutes.

"In terms of what we're doing strategically, you'll just have to wait and see," Ergen said, referring to his recent spate of investments. "It's a little hard to explain it this early in the show, so to speak. And for you skeptics out there: Of course, 'Seinfeld' was a show about nothing. So it could be a strategy about nothing, if you're skeptical. But … we feel it ultimately fits together."

Ergen also said that wireless carrier Sprint Nextel's demand for $100 million in compensation from DBSD/ICO in return for Sprint's vacating the DBSD spectrum will likely be settled for a much lower amount. "They're claiming $100 million. We think it's materially less than that," he said.

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Hughes Credits Broadband Stimulus Funds for Subscriber Boost

PETER B. de SELDING, PARIS

Satellite broadband service provider Hughes Communications on May 5 said it has continued to add subscribers to its U.S. consumer broadband satellite service this year without sacrificing profitability and that the U.S. government's broadband stimulus program is generating more business than expected.

Germantown, Md.-based Hughes, which has agreed to be acquired by EchoStar Corp. for about $2 billion, also said the delayed launch of its competitor's high-throughput consumer broadband satellite will take pressure off Hughes to compensate with special offers of its own.

In a conference call with investors, Hughes Chief Executive Pradman P. Kaul said the one-year time-to-market advantage that ViaSat Corp. expected to have with the launch of its ViaSat-1 Ka-band satellite early this year has "obviously been reduced, which is good from a competitive point of view. We don't need to be as aggressive with high-speed [subscription] plans as we would have had to be."

Carlsbad, Calif.-based ViaSat's WildBlue competes with Hughes' HughesNet service in providing satellite broadband to consumers in the United States. WildBlue's growth has been stunted in recent months because of a lack of satellite capacity in those areas of the United States where demand is strongest.

The ViaSat-1 satellite, whose throughput capacity will solve that problem, will not launch before late this summer following a factory incident in which a small amount of hydraulic fluid from a machine working on the satellite leaked onto the spacecraft.

As a result, ViaSat-1 will be in orbit less than a year before Hughes' nearly identical Jupiter broadband satellite.

Hughes reported that as of March 31, its HughesNet consumer broadband service had 613,000 subscribers, a 6 percent increase from Dec. 31. Revenue per subscriber held steady at $75 per month.

In August 2010, Hughes was awarded a $58.7 million contract under the U.S. government's broadband stimulus program. The company began delivering the service last October, offering subscribers a $551 discount in return for one-year commitments. The result, Kaul said, "has far exceeded our expectations" and is a big factor in the subscriber additions HughesNet has booked since last fall.

Hughes is gradually reducing the amount of Ku-band satellite transponders it leases from other operators for HughesNet, with most new subscribers being placed on Hughes' own Ka-band Spaceway 3 satellite. Each Ku-band transponder lease it lets expire saves Hughes $1 million or more per year, meaning subscriber growth immediately swells the gross profit line.

Hughes estimates that, depending on the mix of subscriber packages, it can load 600,000 subscribers onto Spaceway 3. The company is adjusting the speed at which it places new customers on the Ka-band satellite so that it is not fully loaded before Jupiter is operational. Jupiter, which in terms of raw throughput is 10 times the size of Spaceway 3, is expected to accommodate between 1.5 million and 2 million subscribers, Kaul said, given the fact that average bandwidth demand per subscriber is increasing.

The company reported revenue of $264 million for the three months ending March 31, up 9 percent during the same period a year earlier. EBITDA, or earnings before interest, taxes, depreciation and amortization, was a record $58 million.

It was not only the consumer business that grew during the quarter. Hughes' North American enterprise business, which is centered on selling two-way satellite communications terminals and related services to corporate networks, reported revenue of nearly $63 million, up 3.7 percent from a year ago. Its international broadband segment was up nearly 19 percent, to $51.7 million.

The company's mobile satellite systems and terrestrial microwave segments were both sharply down but are not viewed as core businesses.

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NEWS BRIEFS

NEWS BRIEFS FROM PAGE 3

Telesat Sees Slight Increase In Quarterly Sales and Profit

Satellite fleet operator Telesat of Canada, whose owners for several months have been preparing for either a stock-market introduction or a multibillion-dollar sale of the company, on May 5 reported a modest revenue increase and improved profitability for the three months ending March 31.

Ottawa-based Telesat, the world's fourth-largest commercial satellite operator when ranked by revenue, declined in a conference call with investors to discuss the effort by its owners — Canadian pension fund PSP Investments and Loral Space and Communications of New York — to sell Telesat or prepare an initial stock offering.

Telesat Chief Executive Daniel S. Goldberg said only that the company is aware that the market for buyers — in a stock offering or an outright sale — appears strong now but will not necessarily remain that way and that "we're not going to let this drag on forever."

Telesat reported revenue of 202.8 million Canadian dollars ($208.5 million) for the three months ending March 31, up just 2 percent from the same period a year earlier but 4 percent after stripping out foreign-exchange effects. In the year between the two results, the U.S. dollar dropped by about 6 percent relative to the Canadian dollar. Telesat reports its results in Canadian dollars, but most of its revenue and its capital costs are in U.S. dollars.

EBITDA, or earnings before interest, taxes, depreciation and amortization, was 77 percent of revenue for the three-month period, up from 74 percent a year earlier.

Goldberg said the increase in revenue was mainly due to increased sales on the Telstar 11N satellite, which was launched in 2009 and is operated at 37.5 degrees west longitude. Carrying 39 Ku-band transponders, Telesat's newest satellite is now a bit more than 60 percent full and Goldberg said its fill rate should slowly climb toward 80 percent in the next year or two.

Telesat reported that its North American fleet as a whole was 89 percent full as of March 31, while its international fleet was 77 percent full. The company operates 12 satellites and has three more on order and scheduled for launch in the next 18 months. The North American business accounts for about 80 percent of Telesat's revenue.

In addition to its three fully owned satellites, Telesat has purchased from Loral the Canadian coverage of the ViaSat-1 Ka-band broadband satellite owned by ViaSat Corp. of Carlsbad, Calif., and scheduled for launch late this summer. Telesat is paying about $61 million for ViaSat-1's Canadian beams and is assuming a 15-year contract Loral had signed with Canadian rural broadband provider Barrett Xplore, which has purchased about 12 gigabits per second of ViaSat-1 capacity for 262 million Canadian dollars.

Goldberg said pricing in the markets where Telesat is active in selling satellite bandwidth — mainly North and South America, the Middle East, Africa and Asia — has remained stable in recent months, although there has been some weakness in Africa with the arrival of high-throughput fiber lines on the coasts and new satellite capacity in the region.

Latin America, particularly Brazil, remains strong, which is one reason why Telesat wants its Telstar 14R satellite to be launched as soon as possible. Telstar 14R is scheduled for launch May 20 aboard an International Launch Services Proton rocket from Russia's Baikonur Cosmodrome in Kazakhstan. The satellite carries the equivalent of 58 Ku-band transponders and will replace and expand the Telesat capacity over Latin America now provided by Telstar 14, which has 41 transponders and is operated at 63 degrees west.

"We are pretty much tapped out on a lot of the capacity serving that market right now," Goldberg said of Telesat's Latin American service from Telstar 14.

In a May 5 filing with the U.S. Securities and Exchange Commission, Telesat said it had reached a settlement with three insurance underwriters over claims related to Telesat's Anik F1 satellite, which has a defective solar array. The dispute, which has dragged on for a decade, is centered on differing interpretations between Telesat and some of its underwriters over the level of degradation measured on the solar panels.

Earlier settlements had reduced Telesat's claim to 18 million Canadian dollars. In January, the company said, three insurers concluded a negotiated settlement. Telesat said arbitration is scheduled to start in September on the remaining 11 million Canadian dollars in dispute with other underwriters.

C-band Reflector on Intelsat New Dawn Fails To Deploy

Satellite fleet operator Intelsat said May 3 one of the two principal reflector antennas on its just-launched New Dawn telecommunications satellite has failed to deploy in orbit and that release of the other antenna will await attempts to force the first one to spring loose.

The Intelsat New Dawn satellite was placed into geostationary transfer orbit April 22 by a European Ariane 5 ECA rocket. Since then, the satellite's manufacturer, Orbital Sciences Corp. of Dulles, Va., has been overseeing the transfer of the satellite from the point where it was released by the rocket to its test location, at 23.1 degrees east longitude in geostationary orbit. The satellite's final operating location is 32.8 degrees east, where it is scheduled to serve mainly an African audience.

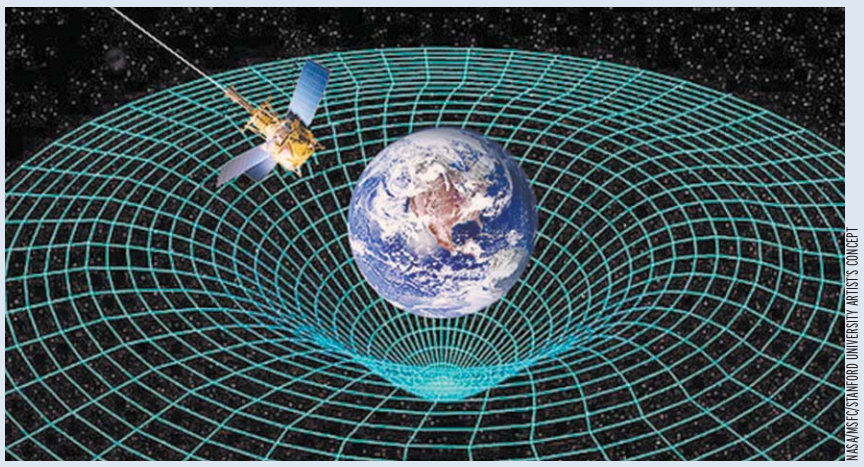
Orbital has told Intelsat that the C-band reflector's ejection-release mechanism has functioned, releasing a series of pins that hold the antenna close to the satellite's body for launch, Intelsat said.

But other data, including temperature readings from the satellite, have confirmed that the reflector remains stuck in place.

Intelsat spokeswoman Dianne J. VanBeber said in a May 3 interview that ground teams have begun a series of maneuvers to remedy the situation. One, nicknamed "rock 'n' roll," consists of shaking the satellite. Another will include exposing the stuck antenna to heat from the sun, alternating with exposure to cold, in an attempt to force deployment.

Intelsat said it would delay releasing the Ku-band reflector while the unblocking attempts on the C-band reflector continue. The satellite has 28 C-band and 24 Ku-band transponders when measured in 36-megahertz equivalents. Aside from the blocked C-band reflector, the satellite is functioning normally, Intelsat said.

Intelsat New Dawn is owned by a joint venture of Luxembourg- and Washington-based Intelsat and Convergence Partners of South Africa. Valued at $250 million including construction, launch and insurance, Intelsat New Dawn is intended to replace Intelsat's Galaxy 11 satellite at 32.8 degrees east. Intelsat estimates that Galaxy 11 will remain operational until April 2015.



NASA/NSF/STANFORD UNIVERSITY ARTIST'S CONCEPT

Gravity Probe B measured how gravity warps space and time

NASA's Gravity Probe B Confirms Einstein Theories

A NASA probe orbiting Earth has confirmed two key predictions of Albert Einstein's general theory of relativity, which describes how gravity causes masses to warp space-time around them.

The Gravity Probe B (GP-B) mission was launched in 2004 aboard a Delta 2 rocket to study two aspects of Einstein's theory about gravity: the geodetic effect, or the warping of space and time around a gravitational body; and frame-dragging, which describes the amount of space and time a spinning object pulls with it as it rotates.

"Imagine the Earth as if it were immersed in honey," Francis Everitt, GP-B principal investigator at Stanford University in Palo Alto, Calif., said in a statement. "As the planet rotates, the honey around it would swirl, and it's the same with space and time. GP-B confirmed two of the most profound predictions of Einstein's universe, having far-reaching implications across astrophysics research."

Gravity Probe B used four ultraprecise gyroscopes to measure the two gravitational hypotheses. The probe confirmed both effects with unprecedented precision by pointing its instruments at a single star called IM Pegasi.

If gravity did not affect space and time, GP-B's gyroscopes would always point in the same direction while the probe was in polar orbit around Earth. However, the gyroscopes experienced small but measurable changes in the direction of their spin while Earth's gravity pulled at them, thereby confirming Einstein's theories.

These results conclude one of the longest-running projects in NASA history. The space agency became involved in the development of a relativity gyroscope experiment in 1963.

Decades of research and testing led to groundbreaking technologies to control environmental disturbances that could affect the spacecraft, such as aerodynamic drag, magnetic fields and thermal variations. Furthermore, the mission's star tracker and gyroscopes were the most precise ever designed and produced.

The GP-B project has led to advancements in GPS technologies that help guide airplanes to landings. Additional innovations were applied to NASA's Cosmic Background Explorer mission, which accurately determined the universe's background radiation left over from shortly after the big bang.

The drag-free satellite concept pioneered by GP-B made a number of Earth-observing satellites possible, including NASA's Gravity Recovery and Climate Experiment

The GP-B mission also acted as a training ground for students across the United States, from candidates for doctorates and master's degrees to undergraduates and high school students. In fact, one undergraduate who worked on GP-B went on to become the first female astronaut in space, Sally Ride.

"GP-B adds to the knowledge base on relativity in important ways and its positive impact will be felt in the careers of students whose educations were enriched by the project," said Ed Weiler, associate administrator for the science mission directorate at NASA headquarters.

GP-B completed its data collection operations and was decommissioned in December 2010. The probe's findings were published online in the journal *Physical Review Letters*.

Texan Named Vice Chairman Of Space, Aeronautics Panel

U.S. Rep. Lamar Smith (R-Texas) has been named vice chairman of the House Science, Space and Technology space and aeronautics subcommittee, the committee announced May 5.

As vice chairman, Smith will preside over meetings and hearings in the absence of the subcommittee's chairman, Rep. Steven Palazzo (R-Miss.).

Smith, a 24-year veteran of the House of Representatives, chairs the House Judiciary Committee. His congressional district includes parts of San Antonio and Austin.

Integral Systems Awarded Multiple U.S. Gov't Contracts

Satellite control systems provider Integral Systems said May 2 its military and intelligence group was awarded $21.8 million worth of U.S. government contracts during the first three months of 2011,

Under the terms of the contracts, Integral Systems will provide its Epoch Integrated Product Suite Satellite Fleet Management System and help build, maintain and plan for what the Columbia, Md.-based company described as "some of the military's most strategic satellite-based systems."

Italian Astronaut's Mother Dies While He's in Space

An Italian astronaut living aboard the international space station since December had to miss his mother's funeral because he will not return to Earth until late May.

The European Space Agency (ESA) on May 2 notified Paolo Nespoli during a private call to the space station that his mother, 78-year-old Maria Motta, had died that day in her hometown of Verano Brianza just outside Milan.

Motta's funeral took place May 4 in Verano Brianza. Half an hour later, as the space station flew over Italy, the crew stopped work and observed a minute's radio silence to honor her memory.

Nespoli will have plenty of support from Earth and space as he grieves, ESA officials said. He is currently in the final weeks of a six-month mission to the international space station and due to return home May 23 aboard a Russian Soyuz spacecraft. "We all are in our minds very close to Paolo and his family, and try to give him sufficient strength in space to cope with this difficult situation and overcome this severe personal loss which is already very difficult in normal conditions, but for Paolo still being on the International Space Station it is even harder," said Michel Tognini, former ESA astronaut and the head of the European Astronaut Center, in a statement.

"There are probably no words that could relieve this sadness but our thoughts are with Paolo, his family and friends," Tognini said.

ESA's director general, Jean-Jacques Dordain, and the director for human spaceflight and operations, Thomas Reiter, also contacted Nespoli to express their condolences and the agency's support.

Reiter attended the funeral on behalf of the agency, while fellow Italian astronaut Samantha Cristoforetti delivered the condolences of the European Astronaut Corps.

To help Nespoli cope with his mother's death, ESA's flight director and support team modified his work schedule.

Astronauts who serve long-duration missions on the space station are given special briefings and training to help them prepare for being away for an extended period of time. This preparation includes topics such as family support and the potential deaths of friends or family.

Nespoli, like his other station crewmembers, has regular access to an Internet protocol phone to call his family, as well as email and other Internet communication tools.

NASA and space station mission control also will provide support to Nespoli as he copes with his loss.

"As an ESA astronaut, ESA will be the primary provider of psychological support for Paolo," said NASA spokeswoman Nicole Cloutier-Lemasters. "However, Mission Control and NASA flight surgeons and support team are certainly available to assist as needed."

German Free Trial Pays Off For SES Astra's HD Plus

Satellite fleet operator SES of Luxembourg on May 2 said its service providing high-definition satellite television channels to German viewers for a monthly fee after a year's free trial has converted two-thirds of all initial users into paying customers.

In an early test of what SES is counting on as a new revenue stream, SES Astra's HD Plus has won over 113,500 subscribers, each paying an annual fee of 50 euros ($74). That is 66 percent of the total number of customers who, between November 2009 and March 2010, signed up for a year of free HD Plus service once they purchased HD Plus cards from retail outlets.

Another 655,000 German customers have purchased the cards and are in the middle of their 12-month free trials. While no guarantee can be made as to how many of these customers will convert to paid subscriptions, SES Astra spokesman Marcus Payer said May 2 that the company believes a two-thirds conversion rate is likely to hold for the future.

HD Plus provides eight free HDTV channels that these SES Astra satellite customers would not ordinarily receive. HD Plus customers do not need to sign a contract, and the service cuts off automatically after 12 months if it is not renewed.

SES Astra plans to extend the HD Plus program lineup this summer by adding Sky Deutschland HDTV channels, which can be received by Sky customers' existing HD receiver.

Germany has long been known in Europe as a nation that resists pay TV service. SES officials say HD Plus may mean things are changing.

"In a country where the question of whether people are willing to pay for television has been discussed for more than 20 years, the first figures of HD Plus are certainly remarkable," HD Plus Chief Executive Wilfried Urner said in a May 2 statement. "A conversion rate of 66 percent is clearly above the expectations."

Industry officials say SES Astra has ordered more than 2 million HD Plus cards from manufacturers, including the 769,000 already sold, in anticipation of future demand.

Former Astronaut Sullivan Moving Up at Commerce

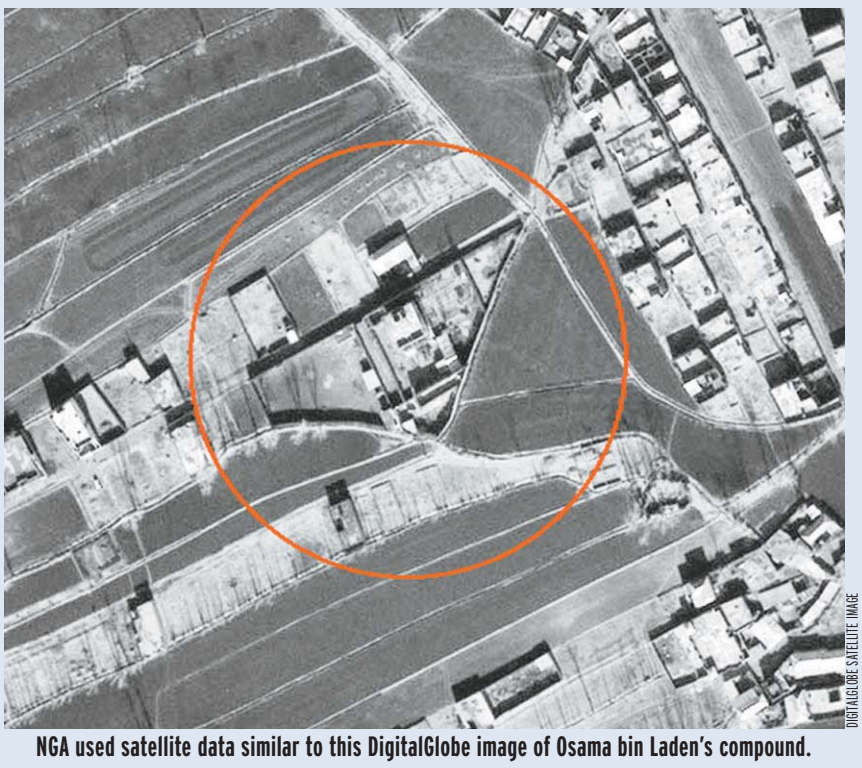
Former NASA astronaut Kathryn D. Sullivan is ready to serve as U.S. assistant secretary of commerce for environmental observations and deputy administrator of the National Oceanic and Atmospheric Administration (NOAA) following U.S. Senate confirmation May 4 of her presidential appointment.

Sullivan, who previously served as NOAA's chief scientist, is a veteran of three space shuttle missions and was one of the first six women selected for the astronaut corps.

In her new position, Sullivan will provide agency-wide direction on satellites, space weather, water, ocean observations and forecasts, NOAA said in a press release announcing her confirmation.

THE ROLEX AWARDS FOR ENTERPRISE PHOTO

Kathryn D. Sullivan



DIGITALGLOBE SATELLITE IMAGE

NGA used satellite data similar to this DigitalGlobe image of Osama bin Laden's compound.

NGA Outlines Role in Osama bin Laden Takedown

The U.S. National Geospatial-Intelligence Agency (NGA) played a key role in the planning of the May 2 raid in Pakistan that killed terrorist leader Osama bin Laden, the agency's top official announced May 2.

NGA employees, who specialize in mapping and imagery intelligence, had been working behind the scenes for more than a decade to locate the United States' most wanted criminal, NGA Director Letitia Long said in a statement provided to *Space News*. Working alongside the Central Intelligence Agency and National Security Agency, NGA provided imagery, geospatial and targeting analysis, and modeling support to plan the mission, she said.

"I am extremely proud of the work that NGA men and women have done that led directly to this outcome," Long said. "Their [geospatial intelligence] was critical to helping the intelligence community pinpoint bin Laden's compound."

U.S. President Barack Obama announced the success of the raid shortly after its conclusion. A team of 79 Navy Seals flew in helicopters from Afghanistan to bin Laden's compound in Abbottabad, Pakistan, where they killed five people including bin Laden. No Americans were killed in the operation.

Aerospace Corp. Wins $658M In NASA Support Contracts

NASA awarded five sole-source contracts for engineering, evaluation and test services worth a combined maximum value of $658.25 million over the next six years to Los Angeles-based Aerospace Corp., the agency announced April 29.

Under the terms of the indefinite-delivery, indefinite-quantity agreements, Aerospace Corp. will provide technical products and services to NASA headquarters in Washington for a maximum value of $89 million, according to an April 29 news release. The balance of the five cost-plus-fixed-fee contracts will support eight field centers around the country, including up to $234.25 million for NASA's Goddard Space Flight Center in Greenbelt, Md., and Ames Research Center at Moffett Field, Calif.; $210 million divided among Johnson Space Center in Houston, Glenn Research Center in Cleveland, and Dryden Flight Research Center in Edwards, Calif.; $75 million for Langley Research Center in Hampton, Va.; and $50 million split between Marshall Space Flight Center in Huntsville, Ala., and Stennis Space Center in Mississippi, according to the release.

Aerospace Corp., a federally funded research and development center, will provide independent assessments of select NASA programs and projects, including validation of technical risks, cost estimates and schedules, as well as safety and mission assurance risks. The company also will conduct management, scientific and technical studies.

NASA Partners with UMBC On Solar-planetary Center

NASA will pay the University of Maryland Baltimore County (UMBC) nearly $10 million over the next five years to establish a Solar-Planetary Sciences Center at the agency's Goddard Space Flight Center in Greenbelt, Md., to conduct research and develop concepts and requirements for solar-planetary science missions under a collaborative research agreement announced May 3.

The five-year agreement, which runs through May 8, 2016, but can be extended an additional five years at NASA's discretion, will allow UMBC and Goddard scientists to develop mission concepts and cooperate on observational, experimental and theoretical research in support of NASA's strategic heliophysics science objectives.

Comments: Brian Berger, bberger@spacenews.com

"…departments and agencies shall work jointly to acquire space launch services and hosted payload arrangements that are reliable, responsive to United States Government needs, and cost-effective."

NATIONAL SPACE POLICY
June 28, 2010

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May 9, 2011

MILITARYSPACE

Industry Hails Pentagon Satellite Lease Concept, In Principle

PETER B. de SELDING, PARIS

Commercial satellite fleet operators are applauding a U.S. Defense Department proposal to lease a full commercial Ku- and Ka-band telecommunications satellite covering the Middle East for 15 years as an example of out-of-the-box thinking but expressed doubts about its feasibility.

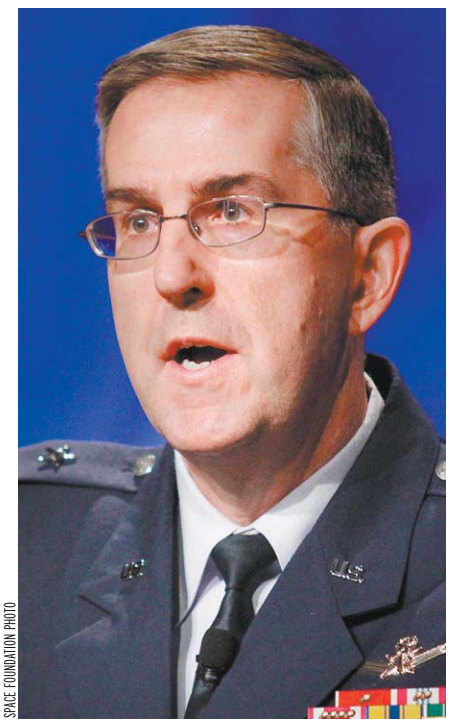
These companies said the proposal, made in the form of a request for information by the Defense Information Systems Agency (DISA), illustrates how far the Pentagon's thinking has come with respect to the use of commercial satellite bandwidth.

"This is an interesting proposal that would have been unthinkable even a year ago or so," said an official with one satellite operator, speaking of DISA's Assured Satcom Services in Single Theater, or ASSIST, concept. "But I would not hold out much hope that it can result in a contract, at least not in its current form."

An official with another satellite operator that also does regular business with DISA expressed a similar view and added that industrial interests in the United States might also play a role in scuttling the ASSIST idea insofar as it might result in fewer military-owned telecommunications satellites being built.

DISA set an April 15 deadline for industry responses to the ASSIST solicitation, which asks the commercial sector to propose building a mixed Ku- and Ka-band telecommunications satellite that would be used by the U.S. Central Command in the Middle East, South and Central Asia, and North Africa. It is this region in which the Department of Defense, which is the world's single largest buyer of commercial satellite bandwidth, invests most of its annual commercial satellite budget.

The Ku-band frequencies would be used for airborne intelligence, surveillance and reconnaissance systems. The Ka-band would be reserved for tactical ground links.



SPACE FOUNDATION PHOTO

U.S. Air Force Maj. Gen. John E. Hyten

DISA proposes to spend $440 million over the 15-year life of the satellite, with that sum also including investments in ground terminals as needed to use the selected satellite.

According to DISA, the U.S. Central Command currently uses Ku-band capacity on 20 different commercial satellites in the region. The agency estimates that what it calls its "aggregate sustained demand" is more than 5 gigahertz of bandwidth permitting links with more than 1,200 terminals. Most of this capacity is purchased in small pieces for periods of one year.

Buying commercial capacity this way — multiple contracts, each for a relatively small amount of capacity, for one-year periods — is much more expensive than taking out a long-term lease. Commercial satellite owners and the Defense Department have been discussing for several years how to introduce greater predictability to the military's bandwidth purchases. This would allow operators to better plan for future satellites with the promise of an anchor customer. For the military, it would lower the cost of bandwidth.

"Buying commercial bandwidth on the spot market is the most inefficient way," said U.S. Air Force Maj. Gen. John E. Hyten, director of space programs in the Office of the Assistant Secretary of the Air Force for Acquisition. "We need long-term agreements to assure supply." Hyten made his remarks April 14 during the U.S. National Space Symposium in Colorado Springs, Colo.

But wide agreement on the problem has not, up to now, resulted in bulk purchases of commercial bandwidth over the long term. This capacity supplements bandwidth from the military's own satellites, such as the fleet of Wideband Global Satcom Ka-band satellites now being deployed.

ASSIST is viewed as a breakthrough in terms of commercial buying practices, even if — as may be expected of a first-time effort — it is seen as infeasible for multiple reasons.

Speaking informally, and under the condition of anonymity so as not to appear critical of one of their biggest customers, industry officials said the DISA deadline for the capacity being available — December 2014 — is too close to allow bidders to respond fully to the requirements in the ASSIST request for information.

First off, they said, Ku-band capacity over the Middle East is already in short supply and is selling for around $1.5 million or more per 36-megahertz-transponder equivalent. Asking an operator without booked capacity to step in with a new satellite whose frequencies are already coordinated and validated by international regulators by December 2014 may be asking too much.

Second, they said the Ka-band component poses problems insofar as few, if any, operators that the Defense Department would be willing to deal with have well-developed plans for Ku-/Ka-band spacecraft in the region.

Yahsat of Abu Dhabi, United Arab Emirates, owned by that government's investment arm, Mubadala, is a startup operator that just launched a Ku-/Ka-band satellite, Yahsat 1A, and plans an all-Ka-band Yahsat 1B for launch within the year. It remains unclear how much unsold capacity Yahsat has available.

Another difficulty with ASSIST is that DISA reserves the right to redirect the satellite bandwidth to different theaters during the contract's 15-year life. "How would frequency coordination be handled for such a move?" one industry official asked DISA, according to a DISA fact sheet published after the information request.

DISA's answer was that while the agency would seek such a change of coverage only as part of a long-duration shift, it nonetheless would be the job of the service provider to assure the frequency coordination needed to allow the change in bandwidth footprint.

This requirement adds a serious complication to any attempt to register Ku- and Ka-band frequencies with the International Telecommunication Union, a U.N. affiliate that coordinates wireless broadcast frequencies and satellite orbital positions.

Responding to another industry question, DISA said it may be willing to have the Ku-band capacity on one satellite, with the Ka-band on another spacecraft. But "industry would be solely responsible for obtaining licensing and orbital allocation using their normal process," DISA said.

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Slowed Production Pace To Drive Up Cost of GPS 3 Satellites

TURNER BRINTON, WASHINGTON

The U.S. Air Force expects the cost of GPS 3 satellites now in development to rise by 5 percent as a result of a decision the service made in December to slow the annual production rate of the next-generation timing and navigation satellites.

The Air Force Space and Missile Systems Center in 2008 awarded Lockheed Martin Space Systems of Denver a $1.5 billion contract to design and build the first two GPS 3A spacecraft. The company expected to produce as many as 12 satellites in the first block at a rate of four per year. The Air Force has since set an eight-satellite limit on the first block buy and instructed Lockheed to slow the production rate to a less-efficient two satellites per year.

After passing a critical design review in August, the program in December received so-called Milestone C approval to enter the production phase, at which time the production pace was slowed to two a year, according to Air Force spokesman Hien Vu. The total program cost estimate was updated at that time.

"This [total program cost] update was the first since prior to source selection and contract award in 2008," Vu said in an emailed response to questions. "The 5 percent increase is largely due to a reduction in the number of satellites being purchased per year and the subsequent inefficiencies."

GPS 3A satellites will operate in medium Earth orbit and are designed to produce more accurate signals than previous GPS satellites thanks to improved onboard atomic clocks. The spacecraft will feature a more powerful signal for military users known as M-code, and the L1 civil signal that will be interoperable with Europe's planned Galileo navigation constellation.

Lockheed Martin in March successfully tested an early version of the GPS 3 flight control software at its Newtown, Penn., facilities. The initial software build for the first time demonstrated communications between a flight-like on-board processor, navigation payload and communications payload, according to a March 15 Lockheed Martin press release. The software must now be fully qualified before it is uploaded to a full-scale engineering model known as the GPS Non-Flight Satellite Testbed.

While the GPS 3A satellites remain on track to begin launching in 2014, the Air Force is planning for the second block of spacecraft — dubbed GPS 3B — to include new search-and-rescue payloads that will be provided by the Canadian government.

After buying eight GPS 3A satellites, the Air Force plans to place its first orders in 2015 for the more advanced GPS 3B satellite, Vu said. These satellites are planned to feature Distress Alerting Satellite System (DASS) payloads provided by Canada, according to March 30 written testimony submitted to the Senate Appropriations Committee by Air Force Secretary Michael Donley and Air Force Chief of Staff Gen. Norton Schwartz.

The DASS payloads will operate in concert with the international Cospas-Sarsat satellite-based search-and-rescue system, Vu said. Cospas-Sarsat is a network of sensors hosted on low Earth orbiting and geosynchronous spacecraft that receive distress alerts from individuals carrying specialized beacons. The system has assisted in rescuing more than 28,000 people since 1982, according to the International Cospas-Sarsat program's website.

"DASS will greatly reduce the time to locate a beacon, which will result in more lives saved and fewer national resources expended," Vu said.

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MILITARY SPACE QUARTERLY

U.S. National Labs Bring Strengths to Debris Mitigation Effort

DEBRA WERNER, SAN FRANCISCO

The U.S. Department of Energy's national laboratories are using sensors and modeling expertise developed during decades of nuclear treaty monitoring to augment U.S. Air Force efforts to characterize the space environment and mitigate the danger posed by orbital debris.

"There isn't enough money to build new capabilities from whole cloth," said Jeffrey Bloch, program manager for space situational awareness at the Los Alamos National Laboratory in New Mexico. So the laboratories are contributing their expertise in materials science, space environmental sensing, high-performance computing and hypervelocity impacts to Air Force efforts to improve space situational awareness, he said.

In recent years, particularly in the wake of the early 2009 on-orbit collision that destroyed an Iridium communications satellite, U.S. military officials have highlighted the importance of protecting government and commercial satellites from orbital junk and from other spacecraft. The Air Force currently tracks more than 20,000 objects in space, but there are "probably 10 times more objects in space than we are able to track with our sensor capability today," Gen. William Shelton, commander of U.S. Air Force Space Command, said April 12 at the National Space Symposium in Colorado Springs, Colo. Objects that cannot be tracked can nonetheless be lethal to operational space systems, he said.

To reduce the threat those objects pose to U.S. satellites, Air Force officials have called for development of a more sophisticated network of ground- and space-based sensors capable of sharing information, analyzing that information and feeding it into military command and control systems. Department of Energy laboratories are conducting a number of projects aimed at helping the Air Force create that network, Bloch said.

One of those efforts employs the powerful supercomputers used to model nuclear weapon explosions. Physicists and engineers at the Lawrence Livermore National Laboratory in California have created a set of modeling and simulation tools to show the debris produced when an orbiting satellite collides with another object in space.

The work, initiated in 2008, was used to map the debris cloud created when a retired Russian Cosmos satellite collided with an Iridium Communications spacecraft. Livermore scientists were able to create a model of the debris cloud within days, providing Air Force officials with information to assist them in evaluating the risk that debris posed to other satellites, said Scot Olivier, associate division leader for applied physics at the lab.

Since then, the Livermore team has continued to refine those models and to craft plans to give the U.S. Defense Department's Joint Space Operations Center (JSPOC) at Vandenberg Air Force Base in California the tools to conduct its own analysis of orbital collisions. Under the plan, Livermore teams would conduct initial modeling work on the Department of Energy supercomputers, extract information obtained and put that data into a format that could run on JSPOC's computers, Olivier said.

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MILITARY SPACE QUARTERLY

Northrop and U.S. Air Force Close To Finalizing DWSS Contract

TURNER BRINTON, WASHINGTON

Northrop Grumman Aerospace Systems expects to finalize its contract with the U.S. Air Force soon to develop a pair of polar-orbiting satellites that will provide weather information for military users, government and industry officials said.

The omnibus 2011 spending bill signed into law in April provided $175 million for the service's Defense Weather Satellite System (DWSS), which will allow the program to complete a system requirements review for the scaled-back constellation by the end of the year, Linnie Haynesworth, Northrop's DWSS vice president and program manager, said May 3.

The DWSS program was created after the White House dismantled the joint military-civilian National Polar-orbiting Operational Environmental Satellite System (NPOESS) in February 2010. The Air Force was directed to develop its own military weather satellites, while NASA and the National Oceanic and Atmospheric Administration pursue satellites for civil weather prediction and climate research observations.

Los Angeles-based Northrop Grumman was the NPOESS prime contractor, responsible for developing the satellite platforms, managing subcontractor development of instruments and the ground system, and integrating the entire system. Contracts for several of the instruments and the ground system were transferred to NASA to manage. Northrop Grumman remains under contract with the Air Force to build the satellite platforms and oversee the Visible Infrared Imaging Radiometer Suite instruments being developed by Raytheon Space and Airborne Systems of El Segundo, Calif., for DWSS and its NASA-managed civilian counterpart, the Joint Polar Satellite System.

Northrop Grumman and the Air Force Space and Missile Systems Center are "days or weeks" from finalizing a contract action that will allow the company to work to meet DWSS requirements, which are somewhat different from NPOESS requirements, Haynesworth said in an interview.

"The authorization that we would expect here soon would be one that would allow us to pursue DWSS-specific requirements, separate and apart from what is in the NPOESS program of record," Haynesworth said.

Northrop Grumman expects it will retain responsibility for development of the satellite platforms and Visible Infrared Imaging Radiometer Suite, while the government will provide the microwave imagers and space environmental monitoring sensors for the DWSS satellites, which are planned for launch in 2018 and 2021.

One programmatic decision that remains for DWSS is which microwave imager the satellites will fly. The Naval Research Laboratory has been developing the Microwave Imager Sounder for the NPOESS program, but the Air Force last year reviewed other options for the capability. Lt. Gen. Tom Sheridan, commander of the Space and Missile Systems Center, made an instrument recommendation that must still be approved by the Pentagon's acquisition chief; neither the recommendation nor the options under consideration have been publicly revealed.

Since the Pentagon signed off on the DWSS acquisition plan in August 2010, the program has had stable requirements, said Steven Leonard, the

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MILITARY SPACE QUARTERLY

Israel Eyes Overseas Launch of Next Ofeq Spy Satellite

BARBARA OPALL-ROME, TEL AVIV, Israel

Defense and industry officials here are mulling multiple deployment options for Israel's next Ofeq-series optical spy satellite, including launching on a foreign rocket or using Israel's indigenous Shavit 2 rocket operating from an overseas base.

Potential overseas launch sites under consideration include Brazil's Alcantara Launch Center, Europe's Guiana Space Center in Kourou, French Guiana; and — for launches of future-generation Ofeq satellites — the offshore San Marco platform near Malindi, Kenya, which is managed by the Italian Space Agency but is currently inactive.

Billed as the largest and most capable of Israel's electro-optical imaging satellites, the newest Ofeq — like all Israeli government satellites — is being developed by state-owned Israel Aerospace Industries (IAI) around the firm's new OPSAT-3000 bus. Total mass, including fuel, of the Ofeq-10 is 400 kilograms compared with the 297-kilogram weight of the Ofeq-9 launched last June from Israel aboard a Shavit rocket, according to IAI data.

The new satellite will carry a multimode camera, dubbed Jupiter, now in advanced stages of integration at a new national space lab jointly funded by Elbit Systems Electro-Optics Elop and Israel's Ministry of Defense (MoD). According to Elop General Manager Adi Dar, the Jupiter payload is part of the firm's future line of multimission cameras, offering black-and-white imagery with 0.5-meter-resolution or better and 2-meter color images. The camera features a 15-kilometer swath width at an altitude of roughly 600 kilometers.

"Jupiter is the first camera to benefit from the huge investment in infrastructure and calibration that went into this new national lab," Dar said of the facility inaugurated by company executives and MoD officials in late March.

Dar declined to discuss the planned launch schedule for Ofeq-10, but in interviews here, sources said the satellite could be ready for launch in early 2013.

In the meantime, the MoD's Defense Research and Development Directorate and other organizations involved in the Israeli space program are exploring options aimed at maximizing chances for a successful Ofeq-10 deployment.

To avoid launching over enemy countries in the region, Israel launches all of its satellites westward over the Mediterranean Sea, thus forfeiting the benefits of launching in the direction of Earth's rotation. The resulting retrograde orbit extracts heavy performance penalties, with some experts here estimating a loss of up to 40 percent of the Shavit's lift capacity.

> **"Malindi is a real dark horse, but if the Italians can get it operating again and deal with other problems, including terror and piracy, it could materialize as a meaningful alternative for the long term."**
>
> Israeli space official

Since its maiden launch in 1988, Israel's Shavit program has suffered at least three failures out of nine publicly acknowledged launches, leading to the loss of Ofeq-4 in 1998 and Ofeq-6 in 2004. However, sources note the improved Shavit 2 is running a perfect record of two for two, successfully launching Ofeq-7 in 2007 and Ofeq-9 in 2010. Government and industry sources say IAI's MLM Division has firm commitments to continue production of its Shavit series, although use of Israel's Palmachim Air Base as a launch site is far from assured.

So while the three-stage Shavit 2 is technically capable of deploying the heavier and costlier Ofeq-10 into its assigned low Earth, inclined orbit, the inherent risk of failure is driving an ongoing review of alternative launch options, sources here said.

Aside from a traditional Israel-based launch with the Shavit 2, options include Russian or Indian rockets. India's Polar Satellite Launch Vehicle, for example, launched Israel's TecSAR synthetic aperture radar satellite in 2008.

The Indian launch service deal marked the first time Israel turned to a foreign provider to deliver a high-value

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In the future, Livermore researchers hope to provide JSPOC with a direct link to the laboratory's high-performance computers. With remote access to a Livermore supercomputer, JSPOC operators would be able to run their own detailed simulations in the wake of spacecraft collisions, Olivier said.

In a parallel effort, Livermore physicists and engineers have created models to represent the current Air Force Space Surveillance Network, which relies primarily on ground-based radars and telescopes around the world to detect and track objects in space. By analyzing those models, Livermore researchers determined that the Air Force could gather data on orbital debris from collisions more quickly by pointing sensors at the densest part of the debris cloud.

"For the Cosmos-Iridium collision it took about six weeks for the JSPOC operators to find, identify and track the pieces of debris they could see," Olivier said. Livermore models showed that by modifying sensor schedules to focus instruments on the debris cloud in a manner that gives the highest priority to areas with the greatest concentration of objects, operators could have found and tracked that debris in less than a week, he said.

Another effort at Los Alamos focuses on using the space-based sensors the Department of Energy uses to monitor nuclear treaty compliance to improve military space situational awareness. As part of its nuclear detection job, Los Alamos uses ground- and space-based sensors to monitor space weather and characterize the space environment. That monitoring is an essential component of nuclear threat detection because it prevents Department of Energy officials from waking up the president in the middle of the night after confusing an intense solar storm with the effects of a nuclear explosion, Bloch said.

Los Alamos officials are working with the Air Force to investigate ways the Department of Energy could use the sensors designed to detect nuclear detonation to improve space situational awareness and space protection. Government agencies "can't afford to build their own monolithic systems that serve only one mission," Bloch said. "Data sharing and capability sharing is the way of the future in this cost-constrained environment."

Sandia National Laboratories and the U.S. Air Force Research Laboratory also are conducting studies to improve military space situational awareness. The Air Force Research Laboratory is developing technologies to bolster the JSPOC's ability to assess the risk of satellite collisions and to improve space-weather monitoring, Air Force spokesman Michael Kleiman said in an emailed response to questions.

Sandia officials are developing computer simulations to predict the effect on satellites of orbital collisions and to determine the direction resulting debris will travel. Accurate predictions of how that debris moves are important because they can help government officials determine which spacecraft will be threatened by the debris, Steve Gianoulakis, architectures and infrastructures manager for Sandia National Laboratories in Albuquerque, N.M., said in an emailed response to questions.

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DWSS FROM PAGE A3

Air Force's DWSS program manager. Because the first DWSS does not need to be ready for launch until 2018, a decision on the microwave instrument can wait until the fall or later, Leonard said in a May 5 interview.

Since the breakup of the NPOESS program, Northrop Grumman has worked with the government to develop a detailed transition plan that includes a new set of baseline requirements and a new cost estimate for development of the first two DWSS satellites, Haynesworth said. Because many of the requirements for DWSS are the same as those for NPOESS, the company has been able to continue making progress on the program in some areas.

"We certainly are leveraging the actions that we can take with the current contract, those things that are common from the NPOESS program of record and the DWSS program of record," she said. "The bus activity … has continued to make strong progress."

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House Panel Proposes Zeroing Missile Tracking System

WARREN FERSTER AND TURNER BRINTON, WASHINGTON

A U.S. House defense oversight panel's recommendation not to fund a proposed missile tracking satellite system next year drew fire from one prominent member, who nonetheless endorsed the broader measure that contains the provision.

All present members of the House Armed Services strategic forces subcommittee — including Rep. C.A. "Dutch" Ruppersberger (D-Md.) — voted May 4 to affirm the mark-up of their portion of the 2012 National Defense Authorization Act, which is scheduled to be considered by the full committee May 11. The subcommittee, which oversees nuclear weapon, missile defense, deep strike and space programs, provided no funding for the Precision Tracking Space System (PTSS) next year, according to a May 3 committee press release.

The U.S. Missile Defense Agency requested $160.8 million in 2012 for the PTSS, which as currently conceived would be a constellation of low-orbiting satellites providing cuing information to ground-based radars and interceptor systems. It is the operational version of the experimental Space Tracking and Surveillance System, a pair of Northrop Grumman-built satellites that recently demonstrated so-called birth-to-death tracking: the ability to track a missile's flight from launch to atmospheric re-entry.

Under current PTSS plans, another demonstration satellite would be built by the Johns Hopkins University's Applied Physics Laboratory in Laurel, Md., prior to the development of operational satellites. In its press release, the House Armed Services Committee provided no explanation for its decision not to fund PTSS.

Ruppersberger, whose district hosts the Applied Physics Laboratory, defended the PTSS as an essential part of the U.S. national security space architecture.

"Cuts to our space programs will have serious consequences on our ability to dominate space," Ruppersberger said. "The Chinese continue to launch systems into space that could cause severe harm to the United States. We must do more to ensure our space health and safety and not cut programs that help protect it. I believe eliminated funding for PTSS is the wrong course of action."

Overall, the subcommittee recommended spending $79.5 million less on military space programs next year than the Pentagon's proposed $10.2 billion.

The legislation approves the defense secretary's plan to procure two additional Advanced Extremely High Frequency (AEHF) secure communications satellites under a fixed-price contract as part of a wider initiative intended to boost the efficiency of the Pentagon's space procurement system. Known as Evolutionary Acquisition for Space Efficiency, the effort features block buys of satellite systems so that contractors can order parts in quantity.

At the same time, however, the subcommittee proposed transferring $142.2 million from the U.S. Air Force's proposed $974.5 million AEHF budget for 2012 to a separate effort to develop military satellite communications technology.

The bill recommends providing just $10 million of the $134.5 million requested to launch the Deep Space Climate Observatory, which would utilize a satellite platform originally assembled for the long-defunct Triana Earth observation satellite.

Also included in the bill is a measure that would repeal previously enacted legislation mandating that commercial imagery procured by the Pentagon starting in 2011 come from satellites with a 1.5-meter imaging aperture. The current law presents an obstacle to procuring imagery from the current generation of commercial satellites, whose imaging apertures are 1.1 meters in diameter.

Reflecting concerns about the U.S. rocket-making industrial base, the bill directs the White House to devise a national propulsion strategy that examines the impact of the space shuttle's impending retirement and the cancellation of NASA's follow-on Constellation program on the U.S. defense and intelligence community. The plan should include recommendations for "synchronizing plans, programs and budgets across the government to strengthen the solid rocket motor and liquid rocket engine industrial base," the press release states.

In missile defense, the subcommittee recommended spending $109.7 million more next year than the $10.1 billion requested by the White House. The missile defense provisions of the bill include:

- An increase of $50 million over the request of $565.4 million for production of Standard Missile 3 Block 1B sea-based interceptors.
- A $40 million boost above the $424.5 million request for development of the Standard Missile 3 Block 2A interceptor.
- An increase of $100 million over the $1.2 billion request for the Ground Based Midcourse Defense system, which protects U.S. territory against strategic missile threats.

The increase for the Ground Based Midcourse Defense is a bone of contention among members of the subcommittee. "While we agree on the need for effective and proven missile defenses, we disagree on the need for a $100 million funding increase to Ground-based Midcourse missile defense which was included in the mark," Rep. Loretta Sanchez (D-Calif.), the panel's ranking member, said in a prepared statement. "I look forward to having engaging debates with my colleagues on missile defense provisions and on nuclear weapons policy at full committee next week."

MONTHLY LaunchReport

XINHUA PHOTO BY LUO XIAOGUANG

A China Academy of Launch Vehicle Technology Long March 3A rocket (right) launched a Chinese Beidou-Compass navigation satellite April 10 from Xichang Satellite Launch Center, China. An Indian Space Research Organisation PSLV rocket launched ISRO's Resourcesat-2, Singapore's XSat and the YouthSat for India and Russia April 20 from Satish Dhawan Space Center in Sriharikota, India.

APRIL Launches

Date	Launch site	Vehicle and provider	Payload and owner	Outcome or purpose
April 5	Baikonur Cosmodrome, Kazakhstan	Soyuz FG, TsSKB-Progress	Soyuz TMA-21, Russian Federal Space Agency	Launched new crew members to the international space station.
April 10	Xichang Satellite Launch Center, China	Long March 3A, China Academy of Launch Vehicle Technology	Beidou-Compass, China Academy of Space Technology	Launched a navigation satellite.
April 14	Vandenberg Air Force Base, Calif.	Atlas 5, United Launch Alliance	NROL-34, U.S. National Reconnaissance Office (NRO)	Launched a classified payload for the NRO.
April 20	Satish Dhawan Space Center, Sriharikota, India	PSLV-C16, Indian Space Research Organisation (ISRO)	Resourcesat-2, ISRO; XSat, Singapore; YouthSat, India and Russia	Launched an Earth observation satellite, a demonstration satellite and a microsatellite.
April 22	Kourou, French Guiana	Ariane 5 ECA, Arianespace	Yahsat 1A, Yahsat; New Dawn, Intelsat	Launched communications satellites.
April 27	Baikonur Cosmodrome, Kazakhstan	Soyuz FG, TsSKB-Progress	Progress 42P, Russian Federal Space Agency	Launched a resupply mission to the international space station.

MAY Launches

Date	Launch site	Vehicle and provider	Payload and owner	Outcome or purpose
May 4	Plesetsk Cosmodrome, Russia	Soyuz 2-1a, Russian Space Forces	Meridian, Russian Federal Defense Ministry	Launched a military communications satellite.
May 7/8	Cape Canaveral Air Force Station, Fla.	Atlas 5, United Launch Alliance	SBIRS GEO 1, U.S. Air Force	To launch the first geosynchronous Space Based Infrared System missile warning satellite.
May 16	Kennedy Space Center, Fla.	Space Shuttle Endeavour, NASA	STS-134 mission, NASA	To launch the Alpha Magnetic Spectrometer, maintenance supplies and spare parts to the international space station.
May 19	Guiana Space Center, Kourou, French Guiana	Ariane 5 ECA, Arianespace	ST 2, ST 2 Satellite Ventures; GSAT 8, Indian Space Research Organisation	To launch two communications satellites.
May 20	Baikonur Cosmodrome, Kazakhstan	Proton Breeze M, International Launch Services	Telstar 14R/Estrela Do Sul 2, Telesat	To launch a communications satellite.

Launches in early JUNE

Date	Launch site	Vehicle and provider	Payload and owner	Outcome or purpose
June 7	Baikonur Cosmodrome, Kazakhstan	Soyuz FG, TsSKB-Progress	Soyuz TMA-02M, Russian Federal Space Agency	To launch new crew members to the international space station.
June 9	Vandenberg Air Force Base, Calif.	Delta 2, Boeing	SAC-D/Aquarius, Argentina and NASA	To launch Argentina's SAC-D satellite with the Aquarius instrument for NASA.
June 10	Baikonur Cosmodrome, Kazakhstan	Proton Breeze M, International Launch Services	SES 3, SES World Skies; Kazsat 2, Kazakhstan	To launch two communications satellites.

Compiled by Tom Wiseman, *Space News*

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government asset into space. The deal offered a venue for reciprocity for New Delhi's investment in TecSAR and other Israeli satellite technology, sources here said.

A potential Russian launch of the Ofeq-10 could offer similar benefits by furthering diplomatic ties, strengthening embryonic defense trade between the two countries and injecting substance to a bilateral space cooperation framework agreement signed this year.

However, sources here say use of foreign rockets is the least attractive option due to Israel's need to preserve an indigenous launch capability for its Ofeq-series spacecraft. More likely is an overseas strategy to preserve Shavit-launched Ofeqs.

Use of the Shavit 2 outside of Israel's constrained launch environment not only preserves critical domestic industrial capabilities, but offers opportunities to deepen ties and encourage reciprocity with countries and space agencies operating the various sites. An MoD official noted that Brazil, for example, has become a focal point for the ministry's Sibat Defense Cooperation and Export Bureau. Use of the Alcantara site could stimulate Israel's burgeoning trade ties with Brazil, and ultimately may lead to Brazilian procurement of Israeli turnkey satellites or satellite services.

"It's a target market with huge potential, not only in-country, but in the rest of the region," said a Sibat official. He noted, however, that for nearly 20 years, IAI had failed in attempts to cultivate Alcantara as a venue for providing Shavit launch services on the world market.

Kourou offers opportunities to expand ties with the French Space Agency, CNES, for whom Israel is providing a satellite bus and payload for the vegetation and Earth-monitoring Project Venus. It also would allow Israel to add substance to a space cooperative framework agreement signed in January with the European Space Agency.

The equatorial San Marco site off Kenya is seen as a longer-term option for Shavit launches of future Ofeq spy satellites as well as a venue for expanding ties with the Italian Space Agency. The site has not been used for satellite launches since 1988.

"Malindi is a real dark horse, but if the Italians can get it operating again and deal with other problems, including terror and piracy, it could materialize as a meaningful alternative for the long term," an Israeli space official said. The official declined to be named due to sensitivities surrounding the potential revival of the site. Israeli and Italian space officials have been discussing joint development of a series of hyperspectral imaging satellites, although the project remains stalled due to Israel's inability to come up with the necessary startup funding.

An Israeli government official acknowledged that options involving overseas use of the Shavit rocket may require waivers from the Missile Technology Control Regime (MTCR), an international arms control code that restricts the transfer of ballistic missiles and other delivery vehicles capable of delivering a 500-kilogram payload more than 300 kilometers. So far, he said, Israel has not formally initiated the process to secure such waivers to any of the above-mentioned destinations.

"There are lots of ideas floating around, but at this point, it's just background noise," an MoD official said.

In a May 3 interview, the official said MoD will make every effort to preserve its indigenous launch capability through use of the Shavit launcher for the government's Ofeq satellites. "We cannot allow this critical capability to atrophy, and our preference is clearly to stay with Shavit," he said.

Tal Inbar, head of Israel's Fisher Institute Space Research Center, said strategic, operational and industrial-base considerations required Israel to maintain an indigenous launch capability. "Use of the Shavit launcher serves various purposes, only one of which is the need to deliver a particular satellite into orbit," Inbar said, in an oblique reference to the widely reported linkage of the Shavit launch program to Israel's Jericho-series of ballistic missiles.

In a May 3 interview, Inbar declined to elaborate on strategic implications of the Shavit program, but voiced support for efforts to explore overseas launch options. "Diversity of launching sites is important … and thus the overseas Shavit launch strategy should be considered," he said.

Comments: opallrome@barak-online.net

COMMENTARY

EDITORIAL

Messin' with Texas

Say what you will about choosing New York over Houston to host a retired space shuttle orbiter, NASA Administrator Charles Bolden did the agency no favors with some ill-advised public comments leading up to the long-awaited announcement.

Mr. Bolden, a former astronaut who spent part of his NASA career at Houston's Johnson Space Center, unwisely revealed his personal preferences when he told a Houston-area television reporter several weeks ahead of his April 12 announcement that if it were up to him, both Johnson and the Kennedy Space Center in Cape Canaveral, Fla., would get one of the nation's four remaining shuttle orbiters.

"If I were not the NASA administrator, I would say that places that should get an orbiter are Houston, the Cape — any place that played a vital role in the design, development and operation of the space shuttle," Bolden told Houston's KTRK-TV in March, validating the city's claim to one of the U.S. space program's most coveted artifacts.

The day before flying to Kennedy to announce where the orbiters would be put on public display, Mr. Bolden managed to further stoke Houston's sense of entitlement; he also made a muddle of explaining a selection process that put a premium on the host institution's accessibility and public engagement track record.

Appearing before the Senate Appropriations commerce, justice, science subcommittee ostensibly to defend his agency's budget request for the coming year, Mr. Bolden was subjected to a last-minute lobbying blitz by senators who believed — perhaps naively — that their home states were still in the running.

When pressed by Sen. Sherrod Brown (D-Ohio) for details on the "commission" tasked with deciding where the shuttles would go, Mr. Bolden — he was advised by a team of career civil servants, not an outside commission — split hairs and implied several times that the final decision was his alone and had yet to be made.

"If there is such a thing I don't know about it, and I am going to make the decision probably when I get back over to my office this afternoon," Mr. Bolden said. "So if I need to consult with them, somebody should tell me really quick."

To anyone in the know, it had been clear for weeks, if not months, that California, Florida, New York and Washington would get an orbiter and that Texas — a state that has not voted for a Democrat for president since Jimmy Carter in 1976 — would be passed over.

Indeed, the Texas congressional delegation knew well before the formal announcement that Houston had a problem, writing President Barack Obama in March to lament "recent reports" indicating that Houston "is at or near the bottom of a short list ... to host a public display of the space shuttle orbiter."

When Texans learned Houston had been passed over, the reaction from the Lone Star state was as shrill as it was swift. Mr. Bolden, no doubt, got an earful as the congressional notifications were made ahead of his formal announcement.

The NASA administrator admitted as much when the crowd gathered at Kennedy for his announcement gave him a standing ovation upon hearing that the Space Shuttle Atlantis — NASA's backdrop for his televised speech — would be retiring to Florida after returning from its final mission later this year.

"I guess I got something right today," a visibly emotional Mr. Bolden confided in the crowd. "You have no idea what that applause does for me. It's been a rough day."

No doubt, but hardly what one would expect to hear from someone comfortable with the selections he purportedly made just the day before.

On the eve of the announcement, Mr. Bolden assured Sen. Kay Bailey Hutchison (R-Texas) "that every place receiving an orbiter has a historical connection to human spaceflight and in fact I think you will find that every one of them has a historical connection to the space shuttle."

California built the orbiters, Florida launches them and Washington is both the nation's capital and home to NASA headquarters. And New York?

In what regrettably has become common practice, Mr. Bolden made his scripted announcement and left it to others to field the inevitable questions. In this case, it was up to NASA's associate administrator for strategic infrastructure, Olga Dominguez, to explain to a pack of reporters the public outreach considerations that helped seal New York's bid for an orbiter to display at the Intrepid Sea, Air & Space Museum in Manhattan. According to Ms. Dominguez, the USS Intrepid played a role in the water recovery of Gemini- and Mercury-era spacecraft and New York is home to the Goddard Institute for Space Studies, a climate-change research lab headed by NASA's most politically polarizing scientist, the outspoken James Hansen. The amount of tourist traffic passing through the Intrepid museum each year is good reason to retire an orbiter there, but as far as historical connections go, the ones cited by Ms. Dominguez are tenuous at best.

Houston and the Texas congressional delegation probably could have done more to land one of the orbiters; their case seems to have rested primarily on the city's proximity to Johnson. But Mr. Bolden clearly could have done a better job of managing expectations, especially in the Lone Star State.

LETTER

Still Time for Payloads To Board Iridium Train

Your editorial "To Catch a Moving Train" [May 2, page 18] rightly called attention to the challenges faced by the U.S. Department of Defense and other government bodies when it comes to meeting deadlines for deploying hosted payloads on commercial satellites.

It seemed to imply that the deadlines for Iridium Next cannot be met, and the opportunity has been lost. Let me just say that the Iridium Next train has not yet left the station.

Iridium Next presents a totally unique opportunity for placement of hosted payloads on the only fully meshed network of 66 satellites in low Earth orbit with coverage over the entire globe, including the polar regions, which are largely invisible to geostationary satellites.

There will not be another opportunity like this for years to come. There is still time to climb aboard the train, but the window to buy tickets will be closing over the next 12 to 18 months and, fortunately, we're talking with a lot of potential paying passengers.

Matt Desch
Chief Executive Officer, Iridium

SPACE SHOTS

"I recognize that our prices shatter the historical cost models of government-led developments, but these prices are not arbitrary, premised on capturing a dominant share of the market, or 'teaser' rates meant to lure in an eager market only to be increased later. These prices are based on known costs and a demonstrated track record, and they exemplify the potential of America's commercial space industry."

Elon Musk

CEO, Space Exploration Technologies (SpaceX)

Responding to critics in a blog posted May 4 on the company's website.

"Nobody ever said that getting into space would be easy, but when a company has suffered three catastrophic launch failures in a mere seven missions, that's not a good sign. Nonetheless, NASA can't seem to get enough of SpaceX ..."

Loren B. Thompson

Chief Operating Officer, Lexington Institute

In a May 5 blog post questioning SpaceX's achievements to date.

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A New Rocket for Science

S. ALAN STERN

The recent announcement by Space Exploration Technologies Corp. (SpaceX) that it will field and launch its Falcon Heavy launch vehicle in 2013 has been heralded as an important and welcome development in diverse quarters. Reasons cited for this positive reception include heavy-lift applications for defense, satellite communications and human space exploration. But the Falcon Heavy also offers tremendous benefits to science, and that has not been as well recognized.

Among the most important benefits offered by this new rocket, with its 5-meter-diameter fairing and 53,000-kilogram lift capability to low Earth orbit (LEO), is that it is priced in the $100 million category — not far from the old price of the Delta 2 workhorse launcher for NASA science missions over the past two decades. But despite its similar price to Delta 2, the Falcon Heavy will be able to lift nine times what a Delta 2 can to LEO, and almost twice what NASA's current heavy lifter for science, the largest Atlas 5, can — but at half to one-third the cost.

The lift performance of the Falcon Heavy opens up some entirely new opportunities for science, such as fielding planetary sample returns in a single bound, emplacing a multi-node lunar geophysical network, co-manifesting multiple large spacecraft on a single launcher, and relaxing mass constraints and therefore revolutionizing the electrical power available to future research spacecraft.

And with the vehicle's combination of dramatically higher performance and dramatically lower costs, it doesn't take a rocket scientist to understand that broad use of the Falcon Heavy by NASA's Science Mission Directorate could translate to large and much-needed cost savings.

Consider: The typical annual rate of Science Mission Directorate launches over the past decade is three to five. If we adopt a figure of merit savings over current Evolved Expendable Launch Vehicles (EELVs) of just $100 million per launch — a very conservative figure given the recent upward trajectory of EELV launch costs — then over a five-year period the Falcon Heavy dividend could amount to $1.5 billion to $2.5 billion in savings for the Science Mission Directorate. That's enough to build and launch four to 10 additional planetary Discovery missions, astrophysics/heliophysics explorers or Earth science missions over a decade.

With the vehicle's combination of dramatically higher performance and dramatically lower costs, it doesn't take a rocket scientist to understand that broad use of the Falcon Heavy by NASA's Science Mission Directorate could translate to large and much-needed cost savings.

Importantly, however, the benefits to science that the Falcon Heavy offers don't stop with the potential for steep launch cost savings. The rocket offers so much lift capacity relative to its competitors that it also will be able to:

- Enable co-manifesting of science missions with commercial satellites.
- Remove the tight launch mass constraints on science satellites and planetary probes that often drive development costs.

These opportunities can further extend the Falcon Heavy's cost savings and help resuscitate beleaguered Earth and space science disciplines.

And given the tough outlook for the Science Mission Directorate (and indeed all of NASA's) budget in the coming cost-constrained years, combined with the upward pressure of science missions in overrun, the Falcon Heavy looks like rare and much-welcomed relief, a strongly positive indicator in a world filled with too many foreboding challenges to science at NASA.

That said, the promise offered by the introduction of the Falcon Heavy cannot be realized until NASA places this vehicle in its permitted science mission launcher catalog. As such, one hopes that the agency will reduce the flight experience metrics needed to get the rocket into the science mission launch queue as soon as possible. This might entail taking a little more risk than is sometimes desired, but in my view this risk is greatly outweighed by the potential to enable so many additional science missions to come to fruition from the accrued cost savings.

Given the urgency of the times, the many pressing needs of NASA's science mission disciplines, and the current climate's increased taxpayer scrutiny, a sensible but accelerated approach by NASA to bringing the Falcon Heavy through the launch certification process and into its catalog of launchers seems sound policy.

Scientists and science advisory committees have a role to play here alongside the agency, by making recommendations along these same lines, so that the cost relief that the Falcon Heavy offers can create a healthier science mission launch manifest sooner rather than later.

S. Alan Stern is an aerospace consultant and NASA's former associate administrator in charge of science. He is the chairman of the Commercial Spaceflight Federation's Suborbital Applications Researchers Group.

Smarter Air Force Space Acquisition

ERIN CONATON

The following was adapted from remarks prepared for the 27th National Space Symposium in Colorado Springs, Colo.

Rest assured I expect space to remain a core mission for the U.S. Air Force. But in space as much as any area, we absolutely must continue to improve our acquisition processes to make them more efficient, drive down our costs and convince the larger Air Force and Department of Defense (DoD) community that the cost of national security space is justified given many other warfighter priorities.

As noted in the National Military Strategy, enabling the space domain is "critical" to our military operations. The National Space Policy and the National Security Space Strategy both highlight the strategic advantages afforded to the United States through assured access to space and our space capabilities, and stress that we must maintain our leading edge. If we don't, we risk leaving capability gaps that will increase our vulnerability across all operational domains.

As we develop our space investment strategy, the National Space Policy and the National Security Space Strategy both highlight the increasingly congested, contested and competitive nature of the space domain. Air Force Gen. Robert Kehler, commander of U.S. Strategic Command, spoke about the congested nature of space and what we're doing in space situational awareness to mitigate it. Gregory Schulte, deputy assistant secretary of defense for space policy, talked about what we're doing with our international partners to develop norms of behavior to respond to the contested nature of space. And you have heard about what the Air Force and the DoD are doing now — and plan to do in the years to come — to operate our space systems and equip our space forces in the competitive space environment. It's a real challenge.

One fundamental step the Air Force is taking to address the congested, contested and competitive space environment is to enhance those critical military space capabilities that directly support our warfighters and benefit our nation's economy, national security, international relationships, scientific discovery and quality of life. The major areas where we are investing include: satellite communications; advanced missile warning systems; global positioning, navigation and timing; accurate, time-sensitive weather data capabilities; and enhanced space situational awareness.

I will note that these efforts — to which we are committed — must be undertaken in a brutal fiscal environment.

To this end, the Air Force is determined to acquire the right capabilities, in the right time frame, and at the right cost. In today's constrained fiscal environment, we will put taxpayer dollars where they're most needed, and we will work aggressively to maximize the return on our investments.

Reducing costs and improving our acquisition processes are certainly not a simple challenge. But the way we've been acquiring space capabilities — on a one-at-a-time or just-in-time basis, often following production breaks and requirements changes — reduces our buying power and weakens industrial base stability, ultimately making it harder for us to implement our policy objectives.

To remedy this, we're developing specific acquisition strategies that we believe will result in cost savings and a more effective and efficient space acquisition approach. Let me highlight two of the more high-profile efforts we have in the works.

One of these strategies is what we call Evolutionary Acquisition for Space Efficiency, or EASE. Our current procurement practices have led to increased costs due to production line breaks, parts obsolescence and inefficient use of labor. These challenges have prompted multiple calls from Congress for smarter acquisition. So this year we are working with Congress to combat the inefficiency and disruption caused by the status quo approach to procuring satellites.

EASE is designed to drive down costs, improve space industrial base stability and allow for investments in technology that will lower risk for future programs. It has four basic tenets: block buys of satellites; stable research and development investment; fixed price contracting; and full funding over multiple years through advance appropriations.

The first tenet — block buys of satellites — will allow us to purchase economic order quantities of critical parts, run production lines more efficiently, and reduce nonrecurring engineering costs. The resulting savings can be reinvested in research and development to further improve the performance and lower the cost of follow-on systems. This reinvestment — what we call the Capability and Affordability Insertion Program, or CAIP — is an essential component of EASE. Together, these first two tenets will provide much-needed stability and predictability for a fragile space industrial base.

The third tenet — fixed price contracts — works well for satellite programs that have moved beyond the development phase, which is where most of the cost and schedule risk resides.

At the same time, the costs of

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MARKETPLACE

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these and other space systems are such that the Air Force, the DoD and the Office of Management and Budget have concluded that the fourth fundamental tenet of EASE must be full funding through advance appropriations. In the budget environment we are in, we simply can't afford multibillion-dollar spikes every few years. This approach spreads acquisition costs across multiple years, while still applying the principles of full funding.

With Congress' approval, our first effort to implement EASE will be in the Advanced Extremely High Frequency (AEHF) program, beginning in fiscal 2012. We contemplate a similar approach for the Space Based Infrared System, beginning in fiscal 2013. If this approach demonstrates the results we're expecting, we plan to expand its use to even more programs and suppliers of satellites.

We don't believe that EASE is going to fix all the problems we've experienced in our acquisition processes. But it's a concept based on feedback we have been receiving for several years on our acquisition of space systems, and it's based on common sense principles. Bottom line, we simply cannot continue with the status quo, and we think this new approach is a prudent direction to go in procuring space capabilities.

In tandem with this effort, we're pursuing a robust examination of contractor costs and making aggressive efforts to achieve cost reductions. We have a superb service acquisition executive in Dave Van Buren who is leading a rigorous review of the AEHF program. His findings on what AEHF capabilities should cost will put the Air Force in a position to get a better deal for the taxpayer. Our premise is that in exchange for the stability and commitment afforded to the industrial base by the EASE approach, our industry partners need to help us find ways to achieve savings.

With Congress' support, we are confident that the combination of the major elements of EASE, in tandem with the "should cost" review, will help the Air Force achieve considerable savings in the acquisition of some of our most critical space assets.

Another area where the Air Force has devoted significant effort to developing a more efficient, cost-effective acquisition strategy is space launch. Along with our National Reconnaissance Office (NRO) partners, we deliver assured access to space through the Evolved Expendable Launch Vehicle (EELV) program. EELV provides the nation's medium and heavy launch capability with two families of launch vehicles, Atlas 5 and Delta 4. It has delivered a 100 percent launch success rate — 39 in a row. Of course, this success wouldn't have been possible without the hard work, skill and professionalism of our fantastic operators and acquisition professionals, who have been getting it right now for over a decade.

Unfortunately, at the same time, the operational success of EELV has in recent years been accompanied by substantially increasing costs. To control this — similar to what we're doing with the AEHF program — we are aggressively scrutinizing EELV acquisition using an internal "should cost" review, as well as a blue ribbon external review. Our "should cost" review produced 84 cost-saving recommendations for the near- and mid-term, for example; the Air Force Space and Missile Systems Center is already working to implement these recommendations, which promise significant savings, while Air Force acquisition leaders continue to dig deeper into the current cost structure.

Several studies have independently recommended an acquisition strategy that procures a minimum eight cores per year. Consistent with our commitment to deliver assured access to space, we have partnered with the NRO to ensure that level of baseline annual production. The NRO will buy three per year, and the DoD will buy five per year, with the Navy picking up one core in each of fiscal 2012 and 2013. Thereafter, the Air Force has pledged to buy five EELVs per year for the remainder of the Future Years Defense Program. This will have the effect of lowering the cost per booster and contributing to a more stable market for our industrial base.

In addition to taking these steps, the Air Force also recently signed an agreement with the NRO and NASA designed to ensure a consistent position on opportunities, certification and requirements for potential new entrants to space launch. We expect to release new entrant criteria by late this summer, and we expect to allow new entrants to compete for near-term launch missions.

All of the space programs we are developing, investing in and sustaining are designed to support the National Security Space Strategy and National Space Policy by leveraging emerging opportunities to strengthen the United States' national security space posture while maintaining and enhancing the advantages gained from space capabilities.

Thank you to our partners in the companies represented here and with the other government agencies involved in national security space. With your help, the Air Force is at the leading edge of space, delivering and operating the world's most advanced space capabilities. We're doing so in the context of new space policy guidance, and we are doing so mindful of the urgent need to deliver excellence in space and in space acquisition. We appreciate your cooperation and look forward to working with you.

Erin Conaton is undersecretary of the U.S. Air Force.

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PROFILE Alvaro Gimenez

DIRECTOR OF SCIENCE AND ROBOTIC EXPLORATION, EUROPEAN SPACE AGENCY

Arrive and Regroup

Alvaro Gimenez was named director of science and robotic exploration at the 18-nation European Space Agency (ESA) in mid-March and was immediately presented with news that NASA, which is ESA's principal partner in science missions, will be scaling back two previously planned cooperative efforts with ESA.

The double blow made Gimenez's life much more complicated than he might have imagined in the months leading up to his nomination, and it will force a rearrangement of ESA's ongoing ExoMars missions and its selection of the next Large, or L-class, science mission, budgeted at about 1 billion euros ($1.48 billion).

In addition to juggling these two issues, Gimenez must begin preparations for ESA's next conference of its member governments' space ministers, a meeting that occurs about once every three years and determines ESA's multiyear budget.

Gimenez, who was previously the science-policy coordinator in the office of the ESA director-general, assumed his current post May 1. He spoke to *Space News* staff writer Peter B. de Selding.

ESA PHOTO BY P. SEBIROT

You arrived just as NASA delivered two pieces of bad news: The U.S. cannot afford its own rover on a joint U.S.-Europe Mars mission in 2018, nor can it finance a planned collaboration in future L-class science missions. How do you like your job so far?

It's true I was handed hot potatoes from day one. It's part of the challenge of the job! But I am optimistic about the future. We have done many excellent science missions with NASA and we have a number of ongoing collaborations. NASA remains our key partner. As for Mars, the fact is that neither of us can realize the ambitious goals of Mars exploration on our own. We are, I think, linked together in this.

What are your objectives for your four-year term?

One goal is to help provide the scientific community the tools needed to remain competitive, to retain the leadership positions that it has acquired. At the same time, we need to balance risk and feasibility. The key is to invest in technology. One concern I have is that scientists will not propose missions that are too daring because they fear they will never be approved. But to achieve innovation we have to assume risks. Otherwise, there will never be breakthroughs. Without those breakthroughs, you are not making progress.

But if scientists propose huge missions beyond what you can afford, and thus need to combine missions with NASA or Japan, isn't this also risky?

Yes, and that is one of the particularities of the science program. We are user-driven. Users are scientists, and they propose dream missions. Scientists talk with one another across the Atlantic, and they come up with daring and innovative ideas — which is what they should be doing.

One current challenge is the situation in the United States. NASA's programmatic outlook does not allow us to realize in the near future the ambitious cooperative scenarios we have been considering in the past.

What is the next step for the L-class missions that will now, for the most part, need to stand on European-only financing?

There will be a meeting of the Science Program Committee in June during which the approach will be discussed. Back in March we asked backers of the three L-class missions to assess whether they can propose a European-led mission fitting inside the ESA L-class budget. Maybe one or more of them will say, "No we can't." This is what we need to find out before proposing a way forward to the Science Program Committee, which we plan to do in February 2012. We have asked for scenarios not requiring major cooperation with agencies outside ESA. Should this not be feasible we may have to issue a new call for mission proposals, and review the outcome.

Another option is that we launch an M-class mission with the available funds, although this is not what I would like.

What lessons do you draw from this experience with NASA?

One lesson is that you cannot predict everything. What has been more reliable than to cooperate with NASA, until now?

Is the solution to require that all missions are European-only?

We have to implement European-led missions regardless of international cooperation. Such missions have been the backbone of the ESA science program in the past and will remain so in the future. Cooperation is an important element in the program but it cannot replace European-led missions. European-led missions may not match the scientists' dreams. But I cannot believe — and I have not heard anyone say — that we cannot do cutting-edge science missions for 1 billion euros.

Look at what scientists in North America and Europe have done together — the Hubble Space Telescope, Cassini-Huygens, Soho — these are great examples of what can come from cooperation. So if the question is: Do we want to split up these communities in which U.S. and European scientists move and cooperate freely? Do we want to separate them? I don't think so. But cooperation may need to take different forms than what was originally foreseen for the L missions.

How can you reduce the risk that a partner outside your control may come up short?

One way may be to better characterize the risk of cooperation. Up to now it has been viewed as a pure added value. It remains that, but perhaps we should focus on partnerships with a clear lead, i.e., with a minimum percentage to be performed in Europe — 70 percent, 80 percent. Or, conversely, to consider in a few cases junior contributions to missions led by other agencies. What seems clear is that using a partner to stabilize your own budget concerns, which has worked in the past, is unlikely to work in the future.

We have learned that we need to develop missions that realistically fit within our budget constraints. We can't just use our L-class budget as a piece of a much larger mission that is not affordable. Look at Herschel and Planck, two European spacecraft developed as a single L-class mission that are performing fabulous science.

They were also seriously late and over budget and for a time were seen as presenting a threat to your entire program.

Many of the issues were due to the decision to combine the two satellites into a single mission. But despite the difficulties, we got there and we have two exceedingly productive, world-class space telescopes. We need to get past the vertigo that comes from leading. We cannot rely on our partners each time we come up with big ideas.

Is there anything you can do within your budget to increase the frequency of Medium-class missions?

This is an issue we are trying to address — to keep a regular pipeline of proposals coming. There are several different models. For most missions in the science program, ESA leads the funding and the development of the mission, and member states provide the payload. Other missions have smaller budgets and can be led by a member state. Corot for example, was led by France.

ESA invested in Corot in order to save it.

ESA did contribute to Corot, but the point is that Corot is an excellent mission. ESA's system is designed for missions too big for national agencies, and where work can be spread around. We should be flexible enough to lead some missions, and to be contributors to other, possibly smaller missions. In the U.S. you see principal-investigator-led missions, which may be going too far for European tastes. But we should be thinking of a new way of organizing ourselves so that smaller missions, like Corot, are among what we do.

You have spoken about a regular series of technology demonstration missions. What do you have in mind?

Well, LISA Pathfinder would have been an example of what we should have done. It was designed to prove technologies for the LISA mission, which is now being reconsidered. Unlike some disciplines with longstanding experience of space missions, like X-ray astronomy, the fundamental physics community that originated LISA does not have much experience in the space domain. They have longstanding experience in ground-based experiments, but that is not the same as doing things in space. The time it takes from mission inception to launch, as well as the design approach — these are different between terrestrial and space missions, and we need to lead the fundamental-physics community toward becoming regular users of space. But it will take time to introduce this community to what we can offer.

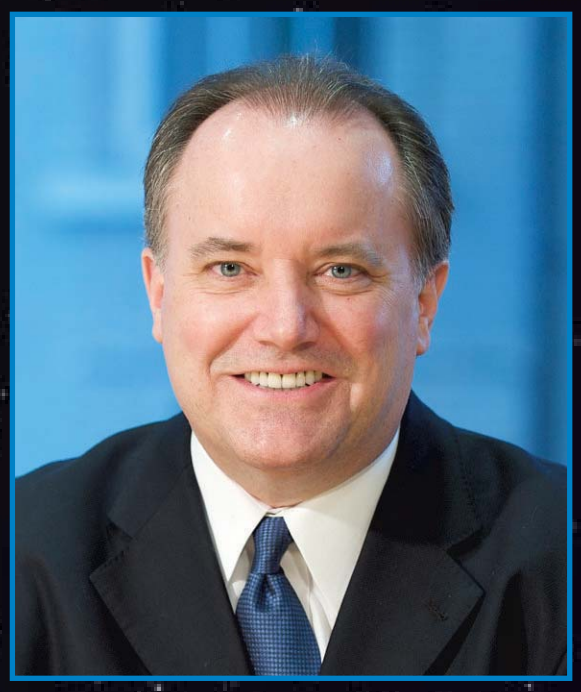
Would you say LISA Pathfinder is worth it even though LISA will not be built, at least not for the moment?

Absolutely. We need this technology expertise for a range of possible future mission concepts. The timeline for the LISA Pathfinder mission now is less critical, however.

But what I am thinking of in terms of future technology demonstrators are missions costing around 100 million euros, with no more than one or two instruments, which could be developed in five years at most. For these missions, there must be leadership from someone else, because we could not apply the customary ESA rules for it. The paperwork, the testing — these would need to be a little lighter than our usual approach. The point is that if you design a small mission and its ends up costing a lot, then it's of little use.

Your budget is decided every three years or so at ESA government ministerial meetings. The next one is planned for late 2012. What can you realistically propose?

Our science budget is, in terms of purchasing power, just about at the level where it was 15 years ago or so. What I hope to be able to propose is that purchasing power is maintained, and possibly to achieve a little bit of real increase. By the time of the ministerial, the Mars program with NASA should be once again on stable footing. What is certain is that we need to start preparing for the ministerial meeting just after this summer.



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